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VOL. XVI NO. 1

UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE

INFORMATION OF THE MEDICAL DEPARTMENT OF THE SERVICE

ISSUED BY
THE BUREAU OF MEDICINE AND SURGERY
NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

JANUARY, 1922
(MONTHLY)

WASHINGTON
GOVERNMENT PRINTING OFFICE
1922

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Navy Department,
Washington, March 20, 1907.

This United States Naval Medical Bulletin is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

Truman H. Newberry,
Acting Secretary.

Owing to the exhaustion of certain numbers of the Bulletin and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
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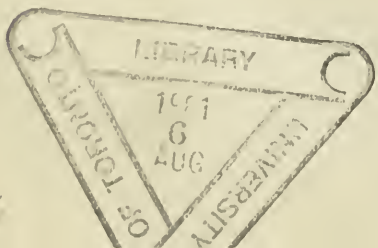


TABLE OF CONTENTS.

Page.

PREFACE v

NOTICE TO SERVICE CONTRIBUTORS vi

SPECIAL ARTICLES:

Mosquito eradication.

By Commander A. H. Allen, Medical Corps, U. S. N 1

Hospital morale.

By Colonel E. L. Munson, Medical Corps, U. S. A 8

The pathologist as an essential factor in clinical diagnosis.

By Lieutenant Commander J. Harper, Medical Corps, U. S. N 14

Tonsillectomy, a surgical procedure.

By Commander G. B. Trible, Medical Corps, U. S. N 17

Cholelithiasis.

By Lieutenant Commander W. A. Brams, Medical Corps, U. S. N. R. F 25

HISTORICAL:

With Anson to Juan Fernandez, Part I.

By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N 35

EDITORIAL:

U. S. Naval Medical Bulletin—On a correspondence course for naval medical officers—On the danger of using strong solutions of phenol in the ear 43

IN MEMORIAM:

Andrew Reginold Wentworth, 1859–1921 49

HONORS AND DISTINCTIONS 51

CLINICAL NOTES:

Broncho-pneumonia and bronchostenosis following appendectomy.

By Lieutenant Commander I. W. Jacobs, Medical Corps, U. S. N 57

Report of four surgical cases.

By Lieutenant Commander J. J. A. McMullin, Medical Corps, U. S. N 58

Chronic cholecystitis.

By Lieutenant C. S. Norburn, Medical Corps, U. S. N 63

One hundred mastoid operations.

By Lieutenant J. W. Green, Medical Corps, U. S. N 69

PROGRESS IN MEDICAL SCIENCES:

General medicine.—Study of transfused blood.—Oral administration of pituitary extract.—Causes and treatment of high blood pressure.—Pernicious anemia.—Differential diagnosis between varicella and variola.—Predisposing factor in diphtheria.—Chronic nephritis 71

Surgery.—First-aid work on shore with Royal Naval Division.—Surgery of naval wounded in hospital yachts and small craft.—Non-surgical drainage of the biliary tract 89

Tropical medicine.—Course of migration of ascaris larvae.—Treatment of fluke diseases.—Laboratory observations on malaria.—Leprosy.—Tuberculosis in Hongkong.—Feeding habits of stegomyia calopus.—Mononuclear leucocyte count in malaria 97

PROGRESS IN MEDICAL SCIENCES—Continued. Page.

Chemistry.—Experimental studies in diabetes.—Experimental studies in diabetes.—Experiments on raw white of egg.—Antiscorbutic action of raw potato.—Diet in hyperthyroidism.—Botulism.—Pituitary extract and histamine in diabetes insipidus.—Protein in the cerebrospinal fluid.—Urine in pellagra.—Acidosis in operative surgery.—Fats and Lipoids in blood after hemorrhage.—Albumin, lymphocytic cells, and tubercle bacilli in sputum.—Nitrous oxide and cholemia.—Lipoids in treatment of drug addiction disease.—Modification of action of adrenaline by chloroform.—Anesthetic and convulsant effects of gasoline vapors.—Absorption of local anesthetics through the genito-urinary organs.—Occult blood in the feces.—Use of iodine for disinfecting the skin.—Food value of various fats.—Chloride metabolism.—Urine hemolysis coefficient.—Hemolytic substances in human urine.—Glucemia and glucosuria.—Pharmacology of some benzyl esters.—Indican in water as an aid to hygienic water analysis.—Relation of dextrose of blood to antipyrine.—Toxic effects of chlorine antiseptics in dogs.—Reaction to epinephrin administered by rectum.—Renal excretion.—Effect of water diuresis on the elimination of certain urinary constituents 100

Eye, ear, nose, and throat.—Eye disease due to syphilis and trypanosomiasis among negroes of Africa.—Lung abscess following tonsillectomy 111

NOTES AND COMMENTS:

Montaigne and medicine.—Venereal prophylaxis in Pacific Fleet.—Benzyl benzoate.—Expedition of London School of Tropical Medicine to British Guiana.—National board of medical examiners.—Papers by naval medical officers.—Chaulmoogra oil in tuberculosis.—An operating room 100 years ago 113

NURSE CORPS:

Instruction at Oteen.

By Miss E. L. Hehir, Chief Nurse, U. S. N. 121

Letter from surgeon general to director of department of nursing, American red cross 122

DIGEST OF DECISIONS 125

BOOK NOTICES 131

QUERIES 139

PREVENTIVE MEDICINE STATISTICS, LETTERS, ORDERS, NEW LEGISLATION, MOVEMENTS OF OFFICERS AND NURSES 141

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc. All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.*

U. S. NAVAL MEDICAL BULLETIN

VOL. XVI. JANUARY, 1922. No. 1.

SPECIAL ARTICLES.

MOSQUITO ERADICATION.[1]

By A. H. ALLEN, Commander, Medical Corps, United States Navy.

The work described in this report may furnish suggestions to the sanitary officer whose duties require him to attempt to solve an analogous problem. In all undertakings of this sort a study of previous attempts and the topography of the area involved is necessary.

The Philadelphia Navy Yard has long enjoyed an unenviable reputation in the summer time on account of the prevalence of mosquitoes. All officers who have been on duty there as far back as 1910 will remember the marine sentries at night with their gauze masks, their gloved hands, and their general odor of kerosene.

One illustration of the number of insects will be recalled by the officers of the U. S. S. *Connecticut*, which was under a three months' overhaul at the Philadelphia Navy Yard in the summer of 1913. The after wardroom country in that ship is supplied with air by a blower, the intake of which is situated on the after portion of the quarter-deck. It was noticed that very little or no air was delivered with the motor running at full speed. Examination of the pipes revealed, not the usual pair of old trousers stuffed in the louver, but an almost solid column, 18 inches in height, composed principally of mosquitoes and flies.

The city of Philadelphia itself, lying as it does between two rivers, has been more or less troubled by these insects, especially in the southern extremity where the two rivers join, and in the northeast section where there are rather extensive marshes.

Students of medicine will remember the epidemic of yellow fever in 1793 in which 4,000 persons died, and also the great work done by the celebrated Dr. Benjamin Rush. From his writings we learn that malaria also was prevalent at that time.

The subject of mosquitoes has occupied the attention of the various medical officers who have been stationed at the navy yard, as seen by their sanitary reports. While some work of a temporary nature was done in ditching and drainage, more time was spent in experiment with repellents. It was not until 1915 that a board was

[1] Report of work done at the U. S. Navy Yard, League Island, Pa.

appointed by the commandant, to which instructions were given to formulate recommendations looking forward to a permanent plan for the elimination of mosquito-breeding areas in the navy yard. This board made a sanitary survey of the yard and held a conference with the mayor of Philadelphia and the directors of the department of public works and department of health and charities, in order to secure the city's cooperation in this campaign. It made a comprehensive report, but on account of lack of funds no permanent work was done. This report, however, furnished a base upon which to build future campaigns.

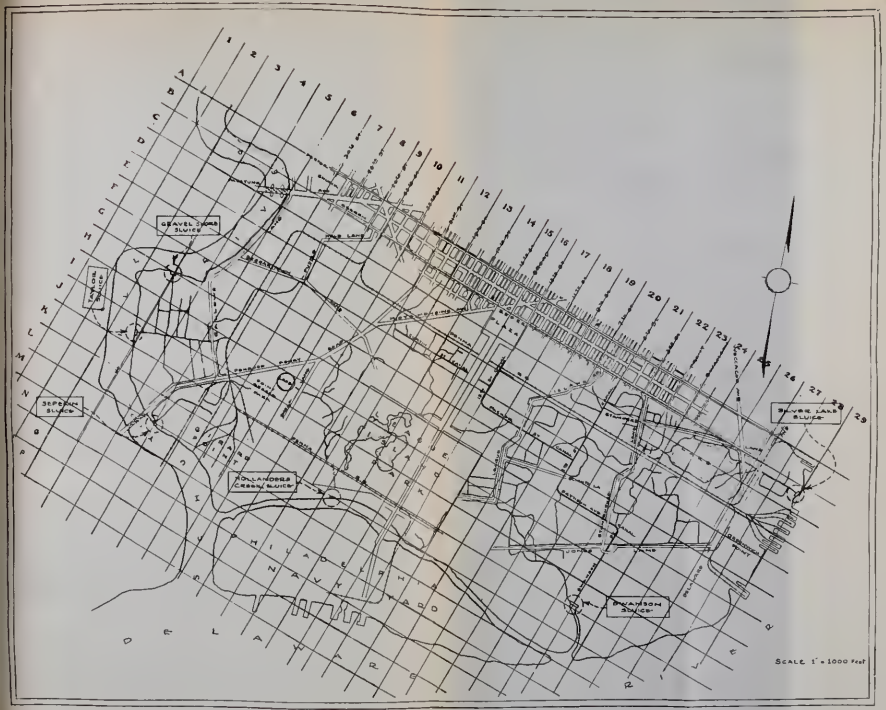
TOPOGRAPHICAL.

The navy yard, Philadelphia, occupies the entire area of League Island which, as its name implies, is about 3 miles in length and about 1 mile in its widest part. Its area is about 960 acres. It is situated at the southwestern extremity of the city at the intersection of the Delaware and Schuylkill Rivers. The Schuylkill empties into the Delaware at the northwestern angle of the yard, a branch of the Schuylkill, known as the Back Channel, forming the northern boundary of the yard and the Delaware River forming its southern boundary according to the accompanying map.

At its highest point the greatest elevation is 16 feet 6 inches. On the Delaware River side there is approximately a 5-foot rise and fall of tide. Buildings of a permanent nature occupy about 400 acres, leaving about 600 acres unoccupied. The ground itself consists of low marsh land with very little sand and is covered with an abundant growth of swamp willows, weeds and aquatic plants.

Broad Street, the main north and south thoroughfare of Philadelphia, is continued through the navy yard to the water front. To do this it was necessary to raise Broad Street to a level of approximately 12 feet and to build a causeway over the Back Channel. The built-up section of Philadelphia stops at Oregon Avenue, which runs east and west from the Delaware River to the Schuylkill River, a distance of about 5 miles, and which is about 1½ miles north of the yard. This leaves an area about 5 by 1½ miles adjacent to the yard of low-lying swamp land, honeycombed with ditches, and partially occupied by small truck farms. To the west of Broad Street the city has completed the League Island Park, a most creditable piece of landscape gardening and engineering, which has reclaimed about 400 acres of swamp land. This project is being continued on the east side also, and on completion will reclaim about 300 acres.

The remaining area is still in much the same condition as it was 50 years ago, although the city is now installing an $18,000 pump to



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Map of city of Philadelphia adjacent to United States Navy Yard.

move the water in the main drainage ditch. This swamp land is owned by private citizens, the title of some areas going back to the original grants of land by King George III of England. Its mean elevation is about 4 feet, but many acres are actually below tide level. Much of it is covered by swamp willows and marsh-growing weeds. The Delaware River at the navy yard is about 1½ miles in width. On the New Jersey side the little town of National Park is situated. The terrain there is very sandy and porous, and no pools or swamps exist. It is rather heavily wooded and mosquitoes abound in the summer. These are chiefly Aedes and breed in the woods.

From this brief description of the mosquito-breeding territory it will be seen that the mosquito eradication project in the yard is closely interwoven with the city's problem, and that no matter how much work is accomplished in the navy yard it is absolutely essential to have the cooperation of the officials of Philadelphia to wage a successful campaign. This is apt to be true everywhere. The sanitary condition of any given locality is always closely related to the conditions of the adjacent area and must be studied in relation thereto. In 1919 a board was again appointed by the commandant. This board completed a sanitary survey of the yard area and, instead of recommending further ditching, took the view that League Island, with its comparatively small acreage, should be made into a natural watershed. Its efforts, therefore, were directed almost entirely to filling in low areas, this being work of a permanent character, resulting in the reclamation of the swamp land and affording solid ground for future building expansion. This board was again convened by the commandant in 1920 and 1921 and has continued its work along the same lines.

ORGANIZATION.

The board as constituted by the commandant consists of four medical officers, one civil engineer, one construction officer, and the yardmaster. Three medical officers act as inspectors. Each one is furnished with a blue print of the yard, which is crosslined alphabetically and numerically, thus affording an easy and definite method of identifying localities. The inspectors divide the yard into three areas, and at meetings of the board furnish exact information as to what is necessary in their areas. They are asked to report along the following lines:

1. Approximate height of ground.
2. Undergrowth extent
   1. Can be cut with machetes?
   2. Can be burned?
   3. Do stumps require blasting?
   4. How many men? How many days?

3. Pools
   1. Area.
   2. Depth.
   3. Should be filled
      - approximate number of cubic yards?
      - ashes—dirt?
   4. Should be drained into ditches?
   5. Should be oiled?
   6. Subsoil drainage practical?
4. Ditches
   1. Should be cleaned?
   2. Should be filled?
   3. Should be deepened?
   4. Should be oiled?
   5. Should pump be installed?
   6. To be constructed (new)?
5. Materials
   1. Tin cans, bottles, etc.
   2. Débris.
   3. Accidental water containers.
   4. Lumber piles. Air space beneath.
   5. New material. Air space beneath.
6. Small boats—steamers, whaleboats, etc.
   1. Capsized?
   2. Tarpaulined?
   3. Bilge oiled?
7. Buildings
   1. Eaves gutters—clean and draining well?
   2. Accidental pools under rain spouts?
   3. Manholes.
   4. Electric conduits.
8. Actual evidence of breeding with identification of species.

By thus having definite questions to answer, the inspectors are able to cover their area once a week and to report in brief time in board meetings. Records are kept of all reports, and the inspectors are interrogated at future meetings on the progress of the work.

As much of the actual labor is handled by the yardmaster he becomes a very valuable member of the board, especially as his efforts may be stimulated by the civil engineer member. He is provided with a horse and buggy in order to make inspections and to cover territory which is inaccessible in automobiles.

In 1919, on recommendation of the board, the Bureau of Yards and Docks allotted $10,000 to pay laborers and purchase oil and tools. Only $5,000 was available in 1920 and 1921. The requests for this money were made by letter from the commandant of the navy yard via the Bureaus of Medicine and Surgery and Yards and Docks. This amount of money was much too small to complete the comprehensive plans of the board, but it did provide a fund which was immediately available to call in a force of 30 laborers. In 1919 dry dock number three was under construction. Through the courtesy of the contractors, their wagons were diverted and dirt dumped in low areas under personal direction of a medical officer. Several working details of enlisted men were obtained from the receiving ship, and these men also worked directly under the medical officer

A problem in drainage adjacent to the navy yard, Philadelphia, Pa.

Mosquito-breeding area adjacent to navy yard, Philadelphia, Pa.

A problem in drainage, navy yard, Philadelphia, Pa.

Mosquito-breeding area adjacent to the navy yard, Philadelphia, Pa.

and cut weeds and dumped ashes as directed. By thus using indirect methods a great deal more filling in was accomplished than is possible with $20,000. In all, during the past three years, the public works department estimates that approximately 300,000 cubic yards of fill have been made. The price of fill in the city of Philadelphia, including the haul, is $1.25 per cubic yard when the fill consists of dirt, cinders, or ashes. The price of fill per cubic yard when it is available from dredged material and the spoil dumped direct behind retaining dikes is about $0.40 per cubic yard. It is a conservative estimation that over $150,000 worth of fill has been made during the past three years through efforts of the board.

The board in 1919 invited the city health authorities and the State of Pennsylvania officers to their meetings with the desire to take advantage of all assistance possible. The chief of the mosquito eradication section of the State Board of Health, in commenting on the board's plan, stated: "It appears to me that the mosquito eradication work in the navy yard is exceptionally well organized."

In 1921 the board considered that its work of a permanent nature had progressed to such an extent that it could conscientiously say that League Island itself no longer presented a menace and could invite the city officials to inspect the result of its work. Accordingly the director of public health, Dr. C. Lincoln Furbush, and the city entomologist, Mr. Hornig, made a visit of inspection to the yard. They agreed that no more work of a permanent nature would be required. The visit was made the opportunity to show the director of health the condition of the areas adjacent to the yard and to emphasize the point that unless a great amount of work was done by the city authorities our efforts would be negative. The accompanying illustrations give a graphic view of the city's problem. It is gratifying to state that the department of health of Philadelphia has done a great amount of oiling, cleaning, and ditching during the past season. A bill has been introduced in the city council providing for a loan of $500,000 to begin filling in the lowlands south of Oregon Avenue. Unfortunately politics have prevented any real progress in this direction.

METHODS OF ERADICATION.

The obvious method of eradicating mosquitoes is the prevention of pools of water by filling in the land. In extensive marshes this becomes impracticable, but in the Philadelphia problem it is believed that eventually all low land south of Oregon Avenue from Schuylkill River to Delaware River can successfully be raised to city grade. This is the ideal to which future efforts should be directed. In the meantime attacks are being made first by oiling. The use of oil has long been a favorite means of combating the pest.

The specification for a satisfactory oil in this climate for general use in ditch, swamp, and pool work is an oil with a specific gravity of 36° to 38° (Baumé), and viscosity (Saybolt) 34° to 38° per minute at 100° Fahrenheit. This is known to the trade as a "straight run gas" oil. The oil known as "Mexican gas" also has given satisfactory results and is being used in the navy yard. This costs about 7 cents a gallon. It is distributed by intelligent laborers supplied with a sprayer. This is a compressed air apparatus with a 4 or 6 gallon tank and ball valve attachment, with an air interchangeable spray nozzle fitted with a spring cock and oil-proof hose. The use of stationary oil drip barrels has not been considered as satisfactory as sprayers due perhaps to local conditions. A highly moist atmosphere, low temperature, and the grade of oil are factors determining whether the oil will form a film or merely lie on the water in oil patches. Kerosene is the best oil in sewer inlets and surface water obstructed by aquatic plants. The film will spread quickly and the odor of the oil in sewer inlets will deter the females from entering to lay their eggs. The drawback in open places is the breaking of the film by the wind and the high cost.

Any oil used for this purpose should be light enough to form a thin film, yet heavy enough to maintain the unbroken surface in the wind. It should not form globules. In small ponds the use of oil in which a quantity of sawdust has been soaked for 24 hours is better than the plain oil.

Ditching.—In the swamp land near the yard ditches have been a necessity. These are constructed so as to be wide enough to provide for the drainage and flow of a maximum rainfall. They should not be more than 4 feet in depth. They communicate with main drainage ditches in which the water is kept moving by centrifugal pumps. The disadvantages of ditches are obvious. They rapidly become clogged up and overgrown with aquatic plants; they require deepening and frequent cleaning and in general are a constant source of expense. Except in extensive marshes, such as exist in the salt marshes of New Jersey, it is generally cheaper to fill in the land and establish subsoil drainage than to maintain a network of open ditches year after year.

Larvacide.—The various forms of larvacide are too expensive for general use. During this campaign attempts have been made to secure sufficient quantities for experimentation, but the opportunity has not presented itself for any careful observations.

Niter cake.—The use of niter cake is very limited in scope. It dissolves slowly and its solution disseminates slowly. It is rather expensive and its use is almost entirely limited to small pools and bodies of water with no outlet. "One gram of niter cake to 1,000

Mosquito-breeding areas adjacent to the navy yard, Philadelphia, Pa.

Insanitary conditions adjacent to navy yard, Philadelphia, Pa.

Mosquito-breeding area adjacent to the navy yard, Philadelphia, Pa.

A problem in drainage, navy yard, Philadelphia, Pa.

cubic centimeters water is barely sufficient to destroy *Culex pipiens* larvae in 48 hours. Six grams of niter cake to 1,000 cubic centimeters water of 7 per cent salinity is required to destroy the larvae of *Aëdes solicitans* in three days." (Hornig.)

VARIETIES OF MOSQUITOES.

The principal species of mosquitoes found in southern Philadelphia are:

(*a*) *Culex pipiens.*
(*b*) *Culex saxatilcs.*
(*c*) *Aëdes solicitans.*
(*d*) *Aëdes sylvestris.*
(*e*) *Aëdes canadensis.*
(*f*) *Psorophora ciliata.*
(*g*) *Anopheles punctipennis.*

It is necessary for inspectors to have an elementary knowledge of the habits and breeding places of these insects and to be able to identify them quickly. For these reasons a brief description of these points is given. *Culex pipiens* is the ordinary house mosquito. It is a small black insect which breeds around dwellings in accidental water containers, such as flower pots, milk bottles, etc.

Culex saxatiles has the same breeding place and is with difficulty differentiated from *C. pipiens*, the principal point being the rapid rotation of the breathing siphon of the larva. It is very numerous in Philadelphia.

Aëdes solicitans is a gray mosquito with clearly marked silver bands on its legs and a white ring around the proboscis. It breeds in brackish water and salt-water marshes. This mosquito is a great flier and remains in the air for hours.

Aëdes sylvestris has not the clearly banded legs of *A. solicitans* and has a long slender breathing tube and two single teeth on the comb. It breeds in the same areas as *A. solicitans.*

Aëdes canadensis is the large woodland mosquito which was unknown here until 1917, when it was imported on shipments of lumber from Michigan. It is found here only in the spring of the year and breeds in hollow logs, under dead leaves, etc.

Psorophora ciliata is a large scaly mosquito. It appears first and disappears last and is always an indication that other mosquitoes are present as it preys upon all other varieties. When the other mosquitoes are exterminated it preys upon itself. It breeds in ditches and stagnant water. It appears, first, around the middle of March in Philadelphia and remains until the beginning of November.

The *Anopheles punctipennis* is a small slender mosquito with one yellow spot on its wings. It breeds along streams, around blades

of grass, and in rain barrels. These mosquitoes are not numerous in this locality.

The few points given above are easily learned by the inspectors, and their search for breeding places is rendered easier by knowing what kind of areas to look for. In addition, through the kindness of the city entomologist, Mr. Hornig, a complete set of beautifully mounted mosquitoes is kept in the navy yard dispensary, hence, with the use of the key given in Stitt's Tropical Medicine, the actual specimen and the mounted identified specimen, identification in most instances is readily accomplished.

SUMMARY.

Mosquito eradication is closely interwoven with sanitary engineering. It requires the services of surveyors, civil engineers, entomologists, and legal authorities. In settled communities obstacles are found in objections of owners of land, in local politics, and in general apathy. It calls for the expenditure of large sums of money. It requires the cooperation of the local commandant, the local health authorities, and, above all, the moral support of the Bureau of Medicine and Surgery. The writer has often been reminded of the words of the marriage ceremony, and agrees that it is a contract to be entered into not lightly or inadvisedly.

HOSPITAL MORALE.[1]

By E. L. Munson, Colonel, Medical Corps, United States Army.

There is much more to running a hospital than in merely insuring good professional treatment and physical care. Mental attitude is important, for the value of morale of patients in promoting recovery is well recognized. Cheerfulness and optimism are therapeutic agents of great value. Every physician knows this—just as he knows that his bedside manner and special attitude toward the case are measures for raising or lowering morale. Sympathy enters, as when the mother kisses the hurt of the child to make it well. Sometimes inert medicaments are prescribed solely for their morale value, while many a tossing patient has been given mental relief and physical rest by the hypodermatic injection of water under the belief that it was morphine. Christian Science capitalizes this by treating imaginary ills with an imaginary remedy. Deft, sympathetic nurses are a great source of help. Probably visits from the families and friends of

[1] Reprinted from "The Management of Men," by permission of Henry Holt & Co., New York City, and the author, Edward L. Munson, Colonel, General Staff, Medical Corps; Chief, Morale Branch, War Plans Division (lately Brigadier General, General Staff).

patients affect their morale more than any other agent. It must not be forgotten that many persons have a morbid, even though illogical, dread of hospital life.

In every military hospital, the physical surroundings of the sick are well equipped and comfortable. Its problems in morale are thus largely dependent on the manner in which its administrative methods are carried out. This has relation to the human factors of the medical officers, nurses, enlisted detachment, other patients, and outside family or friends. All of these correlate in their effect upon morale. Morale problems in hospital largely fall under the following heads: (1) First impressions on entrance. (2) Attention and care during illness. (3) Interest during convalescence. (4) Mental attitude on discharge.

Every consideration of the morale of patients in hospital must take into account the natural tendency of the patient to become critical and despondent with little to occupy his mind but his own troubles. Those in charge of hospital administration are naturally inclined to resent complaints and criticisms which are often so freely given and usually have little if any foundation in fact. But they should remember that it is a natural tendency to the ailing to disparage surroundings rather than to appreciate that the fault may lie in an abnormal self. Often the sick man, whose system repels food, is unaware of this fact and blames his lack of appetite to an alleged unattractiveness of the diet as to selection, preparation, or serving. Many patients are psycho-neurotics, prone to imagine fault or exaggerate defect. It is clear that such a situation calls for patience and forbearance. If the facts are not as alleged, little may be gained by a disciplinary action which may be the starting point for group sympathy and reaction. But careful study of the individual as being psychologically abnormal will often indicate measures which will alter his outlook, perspective, and attitude.

The chief purpose of hospital morale should be to keep the patient's mind off self and to direct his thoughts through cheerful channels. Interests outside himself and his personal problems should be created and maintained. These interests should be carefully selected to meet the needs of the individual patient. Many of them are naturally of a recreational nature, in which the individual is the passive observer or beneficiary of the efforts of others. But as far as possible, the patient himself should have something which he himself can do, thereby creating interest through the constructive instinct. In some large hospitals a letter of greeting is sent by the commanding officer to each patient on admission. This displays interest, giving good advice and information, and tends to allay misgiving, create cheerfulness, and promote cooperation.

It is important that the sick be kept in proper touch with their families and friends outside. If they can not write themselves, letters should be written for them. In serious cases bulletins of conditions should be sent home to show the state of recovery. Home folks are often kept in touch by sending bulletins on picture postals of the hospital, and by putting parents temporarily on the mailing list of the hospital publication, if there be one. Families deserve to know about the hospital facilities in which their relatives are treated. The medical department has nothing to hide here; the more publicity its well-equipped establishments receive the more it is to its advantage.

Visitations by suitable representatives of women's organizations outside the post are desirable within proper limits. Such organizations and individuals can do much to lighten the lot of the sick and aid the recovery of convalescents. By the news of the outside which they bring, and by the rides and entertainments which they offer, they materially reduce the problems of ennui and discontent. Little personal services are appreciated. Thus free mending and darning for patients have a morale value in addition to any material benefits involved. But such visitors should maintain an attitude of helpfulness toward the hospital and its management and not one of unfair criticism.

It is of much value to have hospital wards adopted by various organizations of local communities. The latter furnish music, entertainers, flowers, and reading material, and have a special interest in the welfare of their wards. They are also of use in allaying local criticism if charges reflecting on the management of the ward are unfounded. When convalescents are members of fraternal organizations the hospital authorities should, if desired, make the fact known to the local lodge. If there are church affiliations, the chaplain will see that the desired relations are promptly established.

In military hospitals, visitation of patients by officers' wives and others should be encouraged. The patients should feel that their own associates in the garrison are even more interested in them than outsiders. In the past the captain's wife might visit ailing members of her husband's company, but such action was purely individual. Something organized along general lines is desirable. If the women of the garrison would form themselves into an organization charged with the periodic visitation in hospital of all those needing cheering up, bring a few flowers, reading matter, and simple gifts, it would do much to promote cheerfulness, optimism, and contentment. Military hospitals are places in which a high order of medical and surgical skill are provided, but it is perhaps true that the nature of the military service is such that this tends to be rendered in a relatively impersonal way and that the element of

human sympathy, which is so valuable and so much appreciated, is proportionately lacking.

Some company commanders make it a practice to visit their men while sick in hospital. Most, unfortunately, do not, and completely fall out of touch with those who are sick enough to need hospital care. Sick men long remember and cherish the interest of their company commander in them in their hour of need, as will all of the men in the organization, for the latter will certainly hear of it and take it as a proof of what the captain would do for them under similar circumstances.

The general problem of hospital entertainment should be approached systematically and comprehensively. As far as possible, what the men want should be furnished. In pursuance of such a plan, the entire personnel of patients and attendants at one hospital was card indexed as to needs of the individual and his abilities to contribute to entertainment or instruction. In other words, the positive qualities of the garrison were sought out with the specific purpose of using them to remedy or neutralize the negative qualities thus disclosed. The Red Cross assumes the responsibility for remedying outside needs which concern the home.

Music has an almost therapeutic value with some patients. The use of the phonograph, under proper restrictions, is a convenient agency to this end. Phonograph record exchanges will give great variety by rotating the use of records through different wards. Glee clubs, quartets, nurse choruses, and organizations for instrumental music can visit the wards. Band concerts should be a frequent event. Impersonations, monologues, and vaudeville acts can often be carried out. One-act plays have been successfully produced in wards with portable burlap scenery painted by vocational classes.

More ambitious entertainment can be staged in the hospital club-room amusement center, or out of doors. If the plays and programs can be worked up by the patients, with the hospital personnel in the parts, it will create greater interest through self-activity and local application. Wheel-chair contests, with prizes donated by local institutions, have awakened much interest. Playing for the hospital championship in checkers, cards, chess, and other games arouses interest and rivalry. The hospital should, if possible, have its baseball and other athletic teams, not only for the physical value to participants, but for the interest of convalescent spectators. The entertainment of bedridden patients is a special problem by itself, due to the physical limitations imposed. A series of bedside games has been worked out at some hospitals. Any recreational equipment, games, supplies, musical instruments, writing materials, smokes, etc., for the patients can be obtained from the Red Cross.

A well-selected library should be in every hospital, with its books properly shelved, classified, and catalogued. Further, since many patients can not themselves come for books, the books should be taken to them by means of book carts wheeled daily through the wards. The librarian should also visit each patient at least twice a week to ascertain what special books are wanted and perhaps suggest some in which individuals might be interested. Now that regiments are allocated to geographical districts for recruiting, it is possible and desirable to secure representative papers from the districts concerned for circulation among the patients.

Local hospital papers are a great aid to morale. Where they do not exist, a special place in the camp or local civilian paper for hospital news is desirable. The news not only arouses interest and satisfies curiosity but opens an opportunity for the men to be encouraged in literary work and the writing up of personal doings and experiences. Ward papers have at times been carried on in mimeographed form.

Patients who are physically able to exercise should be required to do so under proper limitations for its mental as well as physical value. If possible, it should be taken in some form as will make it pleasurable and not appear as duty. Croquet, golf putting, and quoits are examples of mild exercise. Automobile rides, trips, and visits to civilian families and points of interest should be encouraged for men physically able to participate in them. The judicious use of passes for this purpose is a great promoter of hospital morale. When men are in hospital for considerable periods of convalescence, they should be taught some light occupation, such as basket making, wood carving, etc., for the purpose of bringing the constructive instinct into play and diminishing monotony. As soon as patients are able to perform them, they should be given light tasks about the hospital of a character not to be regarded as drudgery. Tactful presentation will usually result in the man putting himself in the position of volunteering for the opportunity. The care of the hospital flowers, vines, and shrubs, for example, is a duty congenial to most men.

Psychological uplift, encouragement, and human sympathy can not be evoked by official order—they must express a state of mind which springs from environment and are a part of general esprit.

The patient in hospital will receive that degree of interested attention and type of care which represents the morale of those caring for him. Physically this is expressed in a thousand little things and methods, the sum total of which materially affects comfort and peace of mind.

Patients are in a highly suggestible state of mind and react promptly and often in extreme degree to the mental atmosphere around them. In their own distress and doubt they need to draw

heavily upon the strength and confidence of those about them. If attendants are discouraged, depressed, and dissatisfied, the sick in their care rapidly fall into the same mental state. Bedridden patients are confined to an environment from which there is no escape, hence the special importance of eliminating depressing factors from its components.

It is essential to hospital morale that the patient believes himself in good hands and that he be contented and confident under the conditions to which he must resign himself. He must feel that those upon whom his very existence may depend are not only professionally competent but are personally interested in his case and recovery. He looks especially to the nurses to supply that quality of feminine sympathy which is so craved and appreciated. Some of the more popular nurses can often be made to act as ex-officio assistants of the morale officer. This helps to stimulate their own interest, while information secured by them and measures taken with their assistance can be of great value.

It is apparent that the morale of army nurses and attendants on the sick doubly needs attention, not only as personal and group problems, but for the close relation which it necessarily bears to the morale and welfare of patients. This is a matter too often overlooked, as it is natural for interest and sympathy to particularly center on the sick, with little reference to the indirect influences which react on the patients from those who have them in charge.

For male attendants in hospitals, it must be borne in mind that the relatively housed existence required of them by their special technical duties is unnatural for sturdy young men and may become repugnant to many unless due outlet is afforded for the instincts thus checked. Outdoor sports, exercises, and amusements should therefore be particularly promoted in their case, so that their thoughts when off duty may be turned into entirely new channels. Their recreation rooms should be entirely apart from facilities for the sick. As a result they bring back to their patients news of outside activities in which the latter are interested.

The members of the Army Nurse Corps, like anyone else, need systematized exercise to maintain good physical condition. This is not afforded by routine duties and can not be depended upon as a matter of individual choice. Suitable daily setting-up exercise and periodic walks, rides, tennis, or other appropriate exercise should be required.

With the female sex, entertainments and the social amenities of life count for much. Nurses with personal and socially attractive graces usually meet with no lack in such matters, but there may be others of sterling worth whose similar recreative needs should be given special consideration. Besides entertainments and recreation within the post, acquaintance in the near-by communities is useful.

During the war week-end invitations to private homes were found very valuable in relieving the mental strain of nurses after arduous duty.

THE PATHOLOGIST AS AN ESSENTIAL FACTOR IN CLINICAL DIAGNOSIS.

By John Harper, Lieutenant Commander, Medical Corps, United States Navy.

MacCarty and Broders, in an article on studies in clinico-pathologic standardization and efficiency, call attention to the legitimate actual error in diagnosis of mammary conditions. This actual error consists of a clinical diagnosis of a malignant condition when a benign condition really exists or vice versa. In these errors the indicated operation would be either too radical or not radical enough; the patient would be a victim of too little or too much surgery. Such actual error from a clinical diagnostic standpoint is certainly inevitable and unavoidable from the nature of the pathological condition involved, especially since it is a physical impossibility always to differentiate benign from malignant conditions by any known clinical methods. Legitimate as this error is from the standpoint of insufficiency of signs, symptoms, and clinical history it is absolutely illegitimate from the standpoint of the surgical pathologist. In one organ alone, i. e., the breast, one may see efficiency in one item which in itself is positive proof of the valuable service rendered by the modern fresh tissue surgical pathologist. This item consists of the fact that out of 933 mammary carcinomata the surgical pathologist discovered during operation 211 (22 per cent) carcinomata which the clinician and surgeon had diagnosed benign or doubtful conditions. The practical surgeon to-day, however, is beginning to learn that clinical diagnoses in the breast are frequently not positive, and when the surgical pathologist picks up 22 per cent of the total mammary carcinomata by means of his special training and methods he renders a service of supreme value not only to the surgeon but to the patient. The question which arises from these facts is: Can surgical work be done on this organ efficiently and justly without such assistance?

MacCarty likewise states in his article on the relation of pathologists to the institutional practice of medicine that it was seen in a comparative study of the clinical preoperative instructions and pathologic findings that the clinician is correct in 95 per cent of cases when he makes a positive diagnosis, but experience has taught him that positive diagnoses are frequently dangerous, detrimental to his reputation, and productive in injustice to the patient. Considering this percentage high he refers to the 22 per cent of the carcinomata discovered by the pathologist in the surgical laboratory

and that when the clinician makes a questionable diagnosis of a malignant condition of the breast he is correct in 49 per cent of the cases in so far as malignancy is concerned. Thus it may be seen that the tissue pathologist has a great function which he is capable of exercising and that microscopy is just as essential to clinical diagnosis in practice as auscultation, palpation, and other methods of physical examination. It is not only an accessory, it is an essential.

With the above data in mind a comparative examination of the clinical and pathological diagnosis was made of surgical tissue received at the Naval Medical School during the past two years with the following results:

TABLE OF DIAGNOSES.

Tissue or organ.	Correct.	Undetermined.	Incorrect.	Total.
Gastro-intestinal tract:				
Appendix	40	2	0	42
Gall-bladder	11	1	1	13
Mouth	2	9	1	12
Rectum	3	6	2	11
Intestines	5	2	0	7
Salivary glands	1	5	0	6
Omentum and mesentery	1	4	0	5
Liver	1	2	0	3
Stomach	2	0	0	2
Total	66	31	4	101
Cutaneous system:				
Skin	26	23	6	55
Mammary glands	10	16	3	29
Total	36	39	9	84
Reproductive system (F.):				
Uterus	31	12	6	49
Fallopian tubes	9	1	1	11
Placenta	3	1	0	4
Ovary	1	2	0	3
Vagina	1	1	0	2
Total	45	17	7	69
Lymphatic system:				
Lymph glands	9	13	3	25
Tonsil	12	2	0	14
Spleen	3	1	0	4
Total	24	16	3	43
Subcutaneous system:				
Tissue	17	11	4	32
Osseous system:				
Bone and cartilage	9	13	0	22

BLE OF DIAGNOSES—Continued.

Tissue or organ.	Correct.	Undetermined.	Incorrect.	Total.
Reproductive system (M.):				
Testicle	5	3	3	11
Epididymis	3	3	0	6
Prostate	0	1	0	1
Total	8	7	3	18
Endocrine system:				
Thyroid	13	3	2	18
Nervous system:				
Brain	5	6	2	13
Nerves	0	1	0	1
Total	5	7	2	14
Genito-urinary system:				
Kidney	7	1	1	9
Respiratory system:				
Lung	4	0	0	4
Special organs:				
Eye, etc.	2	0	1	3
Muscular system:				
Muscles	0	2	0	2
Grand total	236	147	36	419
	57%	34%	9%	.....

PATHOLOGICAL CLASSIFICATION.

1. Inflammations (214) 51 per cent:		
Chronic		139
Acute		42
Specific (tuberculosis)		33
2. Neoplasia (166), 40 per cent:		
Epithelial tissue	Benign	56
	Malignant (Carcinomata)	49
Connective tissue	Benign	38
	Malignant (Sarcoma)	23
3. Normal		18
4. Cysts		15
5. Trauma		2
6. Atrophy		2
7. Malformations		2
Total		419

It was found that the above tables revealed certain items of value from several standpoints:

1. When the surgeon made a positive diagnosis he was correct in 57 per cent of the cases.

2. Inflammatory conditions averaged 51 per cent of the total pathological conditions received, of which tuberculosis comprised 15 per cent.

3. Neoplasia averaged 40 per cent of the total pathological conditions received, of which 43 per cent were malignant.

4. The gastro-intestinal tract supplied the greatest number of pathological conditions.

5. The organs or tissues requiring the most assistance from the pathologist from a diagnostic standpoint were: The brain, salivary gland, jaw, lymph gland, bone, mammary gland, testicle, and omentum.

6. The most frequent pathological conditions undetermined or incorrectly diagnosed were: Epuli (mouth), mixed-cell tumor (salivary gland), tuberculosis and malignant growths (omentum and mesentery), carcinoma (skin), benign-fibro-epithelial tumors (mammary gland), tuberculosis, lymphosarcoma and Hodgkin's disease (lymph gland), benign connective tissue tumors (subcutaneous tissue), tuberculosis (bone), tuberculosis and malignant growth (testicle), and tuberculosis and malignant growth (brain).

7. It was interesting to note that 12 of the 29 specimens of mammary gland were from male patients, the pathological condition in practically all male breasts being a benign fibro-epithelial tumor, carcinoma of the male breast being a rare service condition.

8. The service handles and is responsible for the diagnosis of considerably more pathology of the female, especially of the reproductive system, than is ordinarily considered.

9. It is believed that sufficient data has been shown to justify the following statements:

1. That the pathologist in the service has another function aside from studying material at necropsy, namely, the examination of tissue at time of operation for diagnostic purposes.

2. That incomplete operations and incorrect prognoses can be avoided by virtue of the activity of a clinical pathologist working in conjunction with the surgeon.

TONSILLECTOMY, A SURGICAL PROCEDURE.

By G. B. Trible, Commander, Medical Corps, United States Navy.

The title of this article may seem out of place, but after several years as instructor at the United States Naval Medical School, with a student personnel drawn from graduates of the best medical schools of the country, it early became noticeable to me that the ideas on the subject of tonsillectomy possessed by the student body were very vague. After visiting many clinics and noting their widely divergent procedures and teachings, and reviewing numerous articles on this operation, it has become increasingly evident that it is necessary to get back to the fundamental principles of surgery in this opera-

tion. The importance of this is emphasized when it is remembered that tonsillectomy is probably the most frequently performed operation in surgery.

Disregarding the finer anatomy, such as the accurate location of arteries and nerves, and applying the general surgical principles of removing the diseased tissue in toto and preserving the normal and useful structures, the diseased tonsil may be considered roughly a diseased mass in a triangular area. The apex of this area is formed by the blending of the pillars above, the sides by the glosso-palatine arch, or anterior pillar, in front, and the pharnygo-palatine arch, or posterior pillar, behind, and the base by the junction of the tissues of the back of the tongue and the lateral pharnygeal wall. Comparatively it resembles, or is analogous to, a mass in the axilla, in the groin or in one of the triangles of the neck, with these important exceptions: There are in the cases that have not been tampered with one free projecting surface and a posterior limiting membrane, the capsule, and a danger-free area above—the supra-tonsillar fossa, covered by the plica semilunaris, which stretches between the pillars. The simple, the surgical thing to do, then, is to seize the free surface, open above in the danger-free area, dissect away the attachments of the tonsillar mass from the sides and back, remove the tissue in its entirety with the capsule, tie off the bleeding points and leave no rough edges or projecting surfaces; in short, treat the patient as in any other surgical operation. Why this has not been done remains a mystery, probably because surgeons, like historians, repeat one another, and as the earliest recorded operations on the tonsils were some form of ligation, finger enucleation or the guillotine operators keep on doing them in this way. It is clear that to remove this structure completely the same tissues must be severed no matter what method be employed.

The operation described below is not original in any particular, simply a composite of many operations, combined in such a way as to offer a surgical procedure in all its component parts, from the preparation of the patient, through the anesthetic, the operation, and the after treatment.

The diseased faucial or palatine tonsil in nearly every instance is accompanied by a diseased pharyngeal tonsil and the plain hypertrophied tonsil by the hypertrophied pharyngeal tonsil, commonly known as adenoids. Removal of the one without the removal of the other is an incomplete operation and frequently ends in other operations or neglected symptoms. For that reason, among others, a general anesthetic is preferable. The majority of operators working under local anesthesia neglect the adenoids, contenting themselves with a cursory examination and the statement that there were no adenoids. The

shrinking of tissue due to most local anesthetics tends to that view. It can not be urged too strongly that this view is erroneous, and even with no appreciable enlargement of tissue, a thorough curettage will relieve sysptoms which will otherwise persist. One may call it lateral pharyngitis, postnasal catarrh, or what not, but its persistence can not be denied. Since tonsillectomy and adenoidectomy are operations of election in practically all cases, the most painstaking efforts should be made to prevent mortality, and to hasten the recuperation of the patient.

PRELIMINARY PREPARATION.

A routine determination of the blood coagulation and the bleeding time is simple, and, if not physiologically accurate when done by the usual methods, at least has a relative value. Calcium lactate given for a few days will shorten the coagulation time, but if given too long the effect is lost. Pituitary injections were tried for a time, several years ago, and abandoned. Hemoglobin estimation and a differential white count should be made at the same time. Markedly anemic children can be brought up and a tendency to oozing checked by the judicious administration of a little iron. There is no excuse for adding a secondary anemia from hemorrharge that will delay the recovery from six to eight weeks. A differential white count will catch any glaring changes produced by an advanced leukemia. It has not been so long ago that the writer saw a persistent oozing follow the opening and draining of a peritonsillar abscess in a leukemic subject.

Finding conditions satisfactory, the usual examination preliminary to an anesthetic should be made and a long clinical experience in preoperative administration of sodium bicarbonate has shown that 60 grains given to an adult after meals, four days prior to operation, with proportionately smaller dosage for children, will cut down the post-operative vomiting, especially if proctoclysis with 2 per cent each of sodium bicarbonate and glucose be commenced immediately upon the patient's return from the operating room, giving, for an adult, about 500 cubic centimeters at the rate of 40 to 50 drops to the minute.

The time of operation is best set in the morning particularly is this true for children. A mild cathartic the afternoon before operation, or an enema the morning of operation clears the bowel for the proctoclysis. Morphine and atropin by hypodermic for adults, and atropin alone for children are considered advisable, though this procedure should follow the custom of the anesthetist. A mild alkaline mouth wash and gargle, used every two or three hours will mechanically cleanse the mouth and teeth, and lessen the danger of the inhalation of septic particles. Gas followed by ether is the anesthetic of choice. When the patient is relaxed, insert the Crow-

Davis mouth gag in adults, and the Jansen or Whitehead instrument in children. In certain adults with defective front teeth or artificial dentures recourse will have to be made to other types of mouth gag, of which the Dann instrument with a lateral cheek retractor is very serviceable. The Cameron tonsil assistant has been tried, but offers no practical improvement over the Davis or Crow-Davis mouth gags, The advantages of the Crow-Davis instrument are the firm and constant depression of the tongue, enabling the operator to obtain a good view of the field of operation and the fact that ether vapor is thrown low down, just above the epiglottis. Many anesthetists object to this gag and call it dangerous, but their difficulty lies in not drawing up on the handle so that the tongue is drawn down and the chin up. With this instrument less ether vapor is lost, and the effect of the anesthetic is greater, so that more attention to the patient is necessary to prevent too deep narcosis. The Beck-Mueller or some other type of ether vapor machine with suction is necessary for a smooth operation. It was interesting to note the great use of intra-tracheal ether vapor in Montreal for throat operations, and the freedom reported from all chest complications. Pneumonia and lung abscess will be prevented by keeping the patient's head well down and his body inclined during the operation, so that gravity will prevent blood and secretions from trickling down into the trachea, and by not sending the patient away from the table until the site of the operation and the pharynx are thoroughly dry and the tracheal and bronchial reflexes are reestablished. Suction should be confined to the midline, not as is often done, used in the fossæ, for no clots can hold if immediately aspirated.

OPERATION.

With the mouth widely open and the operator using the Pierce-Murphy or Claar or other suitable means of illumination (the Cameron tonsil assistant has a light carrier, but the Pierce-Murphy is simpler, for it can be used with the usual light socket), the tonsil is grasped with heavy Graefe model forceps at the upper and lower poles, or as near there as possible, and is drawn downward and to the mid line. This procedure brings into view a small triangle just above the tonsil, which is the location of the supratonsillar fossa. With a knife or scissors make an opening through the covering fold of mucous membrane. Insert the points of a pair of Metzenbaum or Prince scissors, and by widening the points free the upper tonsillar pole. Retaining the same grasp, or loosening and grasping the freed upper pole, simply dissect down the back and sides of the tonsil, keeping on the capsule: use scissors, Hurd's separator, or whatever instrument suits the fancy. The reflections of mucosa at the attach-

ments of the pillars should be carefully freed, so that all possible tissue will be saved. With the tonsil drawn down from the apex the fossa and its vessels running to the tonsil can be seen; the vessels may be crushed, if thought best, or simply brushed aside, to be dealt with later. Anomalous vessels offer no more difficulty than normal vessels, for they can be seen and not torn or cut blindly. As a rule the lower attachment of the tonsil, for this reason, is better severed with a snare, which can be made to engage the prolongation of lymphoid tissue to the back of the tongue. This is nearly always extra-capsular and if not removed will hypertrophy and project up as a cherry-like mass, giving the appearance of an imperfect tonsillectomy, and that is what it is. This result is sometimes seen after otherwise good guillotine operations on adults. It is not noticed so frequently in children.

The great majority of tonsillectomies present no difficulty. Occasionally a soft, squashy tonsil will be encountered, which tears and offers no hold to the forceps. By seizing the top of such a tonsil with an Ochsner forceps and getting a bite of the capsule one will be able to handle this type as readily as the others. The secondary operations occasionally are very troublesome. In general, grasp the mass, free the bit of mucosa or the cicatrix that may be covering it, get the underlying capsule, and there is no fundamental difference in the operation, nor is any change of technique necessary. It is remarkable to witness the restoration of the pillars and the comparatively normal appearance that will come out of a mass of scar tissue following some previous incomplete operations.

When the fossa is cleared place in it a tie sponge, best not molded prior to sterilization, but one made by tying a tape about a little roll of gauze, folding it in the emptied fossa, so as to check bleeding and enable clots to form in the cut vessels. Rarely will pressure have to be made by a sponge in a curved Foster carrying forceps. Proceeding immediately to the second tonsil, remove it, place the sponge in the fossa, and then remove the adenoids with the La Force adenotome, first pushed well forward, then hard into the vault, closing it slowly. In case either a sharp, bony raphe or a projecting atlas is present and engaged, closing the adenotome slowly prevents their being caught. The adenoid tissue is usually broader in the region next to the back of the septum, and unless engaged and severed there it will not be thoroughly removed. The La Force adenotome should be followed by a small adenoid curette, curetting the sides of the raphe and the tissue in the area near the tube. By pressing a large sponge into the naso-pharynx and holding the nostrils tightly closed for a few minutes all adenoid bleeding will usually be stopped. If not, thorough exploration should be made to detect and remove any

partially separated fragments and tags. Any strips along the posterior pharyngeal wall should be cut cleanly with the scissors.

Suction during this time must be used to prevent any filling up of blood or its running down the esophagus or trachea. Removal of the plug from the first tonsil fossa is next done, and any points still oozing or any free bleeding points should be caught very superficially with a Jackson duck-billed hemostat and a mattress suture just large enough to cover the area inserted, drawn up, and tied. Mere ligation is not reliable except in case of the free ends of presenting vessels. Bleeding is usually from torn veins or from slight rips in the thin muscle sheath or retracted vessels in the superior constrictor itself. Thrombo-plastin and many other styptics have been tried, but for slight oozing hydrogen peroxide has been the most satisfactory. No danger has ever been noted from suturing; the superior constrictor is sufficiently thick to permit this, even in the few cases in which it was deemed advisable to suture in children.

The writer has seen two small hemotomas following the insertion of the needle, both in the upper portion of the fossa. The site at the junction of the lymph tissue around the base of the tongue and the tonsil sometimes has a very refractory bleeder. The suturing of the pillars over a roll of gauze is no longer done. This method of controlling hemorrage was used twice several years ago unsatisfactorily; blood trickling along the surface of the gauze continued until nature came to the rescue and oozing was stopped. Three times in four years it has been necessary to use a postnasal plug for delayed primary adenoid bleeding. Four secondary tonsillar hemorrhages have occurred, one as late as the eighth day. Rest, an ice cap to the throat, and morphine hypodermically stopped them with but little loss of blood. Five or six cases in more than a thousand have been reanesthetized and bleeding points caught by suture with no bad results. The blood was cleared from the fossa, a large sponge on a curved carrier placed tightly in the fossa, gradually drawn from above downward, so that but a little of the fossa came into view at a time, the bleeding point exposed, caught, and sutured. Indiscriminate grabbing in a pool of blood tears the muscle bed, makes more bleeding, and delays healing, for the torn and crushed tissue is devitalized and finally sloughs away.

Every case of hemorrhage seen by the writer, except one, in which there was a delayed primary hemorrhage was preventable; bleeding occurred in doubtful looking areas that would check when pressure was applied for a couple of minutes, then resumed when pressure was removed, but with such a slight and inconsequential oozing that it was decided to chance it, and with the usual result when one acts against better judgment.

AFTER TREATMENT.

A mildly alkaline antiseptic mouth wash is all that is ordinarily required. For the first two days there is a lymph flow which bathes the wound, after that a grayish exudate is formed over the area.

Patients and occasionally doctors may become alarmed over this grayish membrane and mistake it for diphtheria, the more readily as smears will often show a diphtheroid organism, a saprophyte. Wound diphtheria does exist, but in no case seen either in clinics or hospital work has it ever come to the knowledge of the writer as occurring in a tonsillectomy wound—in fact, tonsillectomy will usually clear up a diphtheria carrier.

Nature's treatment for injury is rest and immobilization, and the use of orthoform or aspirin powder by insufflation to relieve the pain and enable the patient to eat and drink freely will, by the needless motion induced, delay healing and tend to cause hemorrhage. With certain cases these measures may be necessary, as well as the treatment of the operation wound by swabbing with antiseptics. In children 48 hours usually suffices to bring about relief from pain and discomfort, but better results are obtained if rest in bed is insisted upon for this length of time in both children and adults. Semisolid food frequently is taken with greater ease than liquids, but no rule can be obtained—each case is a law unto itself—some preferring ice-cold food and drink, another complaining of excruciating pain radiating to the ears if anything cold is taken. Plenty of fluids should be insisted upon and an enema each morning for two mornings does a lot to prevent any rise of temperature from intestinal absorption. In an adult the discomfort lasts from 5 to 7 days, and frequently the grayish exudate has not completely disappeared in 10 days. An occasional mild glossitis has followed too vigorous tongue depression. This condition clears up rapidly by the use of ice externally and small pellets of ice held in the patient's mouth. In a few cases a dislocation of the relaxed jaw has occurred, but always readily slipping into place with manipulation, and in no case was there any trouble following, nor was the patient aware that it had taken place. By using No. 1 catgut for sutures, no removal of them is necessary. Softening and separation takes place in about four days. Occasionally a slight tickling sensation on the sutured side may be noticed by the patient. Formerly, when silk was used, the suture caused trouble later in some instances, either from a small, persistent point of granulation or by giving rise to a minute abscess.

The operation described above has been used in several occasions combined with the repair of a cleft palate. The posterior pillar can

be drawn over after the removal of the tonsil and the gap, especially in the soft palate, bridged easily.

No lung abscesses or septic pneumonias have occurred to date Dealing for the most part with patients who are not at liberty to change physicians when dissatisfied, all bad results have been seen, reasons for them ascertained, and steps taken to correct them.

Duty for several years necessitating the examination and treatment so far as the eye, ear, nose, and throat were concerned of candidates for entrance to and of the midshipmen at the Naval Academy, has shown some very surprising and not altogether favorable results following tonsillectomy, performed not only by service medical officers, but by representative and well-qualified operators in different sections of the country. Tonsil tags or remnants, varying from a small size to half of one or both tonsils, marked adenoid hypertrophy, loss or malformation of the uvula, loss of one or both pillars have been encountered. Sharply defined pillars following tonsillectomy, after a period of a year or more, have seldom been found after any type of operation, but no difficulty or untoward symptoms have been found on that score. No gross changes in the voice have been authenticated, except two or three times a paresis of the soft palate coming on two or three days after operation and lasting about six weeks gave promise of trouble, not alone so far as the voice was concerned, but also from the interference with swallowing. Whether this was due to trauma or to low-grade toxemia from absorption could not be definitely determined.

Neither the operation described nor any other tonsillectomy can be easily done, nor is it free from danger if there is an acute infection or a peritonsillar abscess present. The tonsils with this complication are friable, bleeding is profuse, the plane of cleavage can not be so accurately located, and danger from sepsis or pneumonia is imminent. As a means of saving life in a beginning endocarditis, it may be justifiable, but only after consultation with an internist and a thorough understanding of the risk involved. A thorough removal is difficult, and the leaving of a portion of the infected tissue defeats the purpose of the operation. Extra-capsular masses of tonsillar tissue, or more properly lymphoid tissue, may be encountered not only below the lower pole, for that is almost constant, but behind the upper pole or under the pillars or in the muscle. Masses of lymphoid tissue frequently stud the posterior pharynx wall, or are collected in masses along the sides of the posterior pharynx. Usually they atrophy following thorough tonsillectomy and adenoidectomy with the resultant diminution of infection. Dissection of these masses is not advisable. A parched, glazed, mucosa will follow. Overlooking the slightest fragment of tonsil tissue, whether crypt

bearing or not, will end in disaster. Following postgraduate work under the Viennese school of some years ago, when tonsillectomy was considered unnecessary, and a removal of redundant tissue thought sufficient, it was the writer's unfortunate experience to perform a number of operations, the bad results of which have taken several years to correct, and much diplomacy has been employed in calming the astonished patient when his tonsillitis or peritonsillar abscess returned with undiminished vigor. Luckily the common lay assumption that tonsils and adenoids grow back, helps one in these misfortunes, which are really due to incomplete operations, and progress can be measured by the lessened number of such cases seen.

CHOLELITHIASIS.[1]

By W. A. Brams, Lieutenant Commander, Medical Corps, United States Naval Reserve Force.

Cholelithiasis is not in itself a disease; it is an anatomical result or complication which occurs in the presence of stasis of the bile current or in inflammation with infection of the bile passages.

Gall stones alone do not produce symptoms unless there is stagnation of the bile or infection of the bile passages. This view is grounded on the fact that gall stones are found in about 10 per cent of all autopsied adults, but a very small number of whom showed symptoms of gall-stone disease during life. It is the cholecystitis and cholangitis which play the chief part in producing the symptoms and which can change an inoffensive, preexisting stone into one causing the well-known symptoms of cholelithiasis.

The degree of bile stasis and of infection determines the severity of the course and gives rise to the dangers of this disease. In emphasizing the foregoing we must not, however, lose sight of the fact that a stone may aggravate the condition by producing bile stasis or by traumatizing a mucous membrane already inflamed or which is already infected.

A gall-stone carrier need not be a gall-stone patient. It is when stasis and infection appear that symptoms are produced.

ETIOLOGY.

Stasis of the bile is necessary for production of the noninflammatory, harmless, cholesterin stone. Both stasis and infection are required to produce the inflammatory calcium or bile pigment stone, both of which are associated with clinical symptoms.

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[1] This article is based chiefly on the work of Kehr, Aschoff, and Ortner. The writer has worked with Professor Ortner, of Vienna, for a year and he is indebted to him for the use he has made of his extensive experience and writings on the subject of gall-bladder disease in the preparation of this article.

Slowing of the bile current is caused in several ways. The musculature of the gall-bladder wall is probably atonic and weakened in older people or in those who are not active, thus diminishing the driving power behind the flow of bile. Stout people are perhaps predisposed to this condition for the same reason. This stagnation may be harmless if the bile is sterile, but even then the stagnated bile is a good potential culture medium for any bacteria which may be present. The greater frequency in women may perhaps be explained by the fact that the gravid uterus compresses the bile passages and thus slows the current. It may also be due to infection at the time of delivery.

Other contributing causes are typhoid fever, catarrhal inflammation of the gastro-intestinal tract, sore throat, puerperal fever, and appendicitis.

PATHOGENESIS.

In the absence of infection and inflammation of the bile passages, gallstones may be due to simple bile stagnation with subsequent crystallization of cholesterin. These stones are usually not accompanied by symptoms. The noninflammatory stone is formed as follows: Luschka's crypts are depressions in the gall-bladder mucosa which very much resemble the tonsillar crypts. The slowing of the bile current by any of the before-mentioned factors may increase the pressure within the gall bladder, and this, in turn, may cause these crypts to become deeper, reaching even to the serosa, and to assume a saclike diverticular form. The bile becomes stagnant in the deeper pockets of these crypts and may undergo decomposition similar, in a limited sense, to the decomposition which undergoes in the tonsillar crypts. Exfoliated epithelium, lymphocytes, and detritus may also collect here and hasten the process of decomposition. The cholesterin crystallizes as a result of this, and the increased pressure within the gall bladder compresses these substances into compact masses. These may form the center about which cholesterin continues to be crystallized until stones of considerable size are formed.

The calcium or inflammatory stones have a different pathogenesis. The bile is normally sterile in the gall bladder, cystic duct, and upper two-thirds of the common duct. Even if experimentally infected, the bacteria soon disappear if there is ample drainage. The result is very different, however, with stagnant bile, where the bacteria find a splendid culture medium.

The infecting organisms may gain entrance, either by way of an ascending infection from the gastro-intestinal tract or by a descending involvement from the blood or lymphatic currents, as in typhoid. No harm results as long as the flow of bile is not interfered with. The gall bladder may also become infected if a previously existing

harmless cholesterin stone or one of the before-mentioned factors slows the bile outflow. There is very little circulation in the grooves and pores of the cholesterin stones, and this stagnation, together with the bacteria, may lead either to the formation of a coating of calcium or even to the appearance of pure calcium stones.

PATHOLOGY.

The predominance of cholesterin crystals, arranged in a radiating formation about a center of amorphous material, is characteristic of the noninflammatory stone. The calcium content is very small and layer formation is absent.

The stones are single or few in number, yellowish, grow very slowly, and have a rough, sandpaperlike surface. This is due to the fact that the surface is composed of the projecting ends of the radially arranged crystals. A thin, translucent zone may be seen about the periphery of the stone if it is held against the light.

The cholesterin and calcium stones are not the cause of the symptom complex known as cholelithiasis; they are, on the contrary, the result of the stagnation or inflammation, or both.

A stone of predominant calcium content arranged in layer formation is produced by inflammation. The calcium is chiefly in the form of calcium carbonate or in combination with bilirubin.

There is normally very little calcium in the bile. Chronic inflammation of the gall-bladder mucosa produces a marked increase in the secretion of mucus which furnishes large quantities of calcium carbonate. An even greater source of calcium carbonate is from the large quantity of exudate which accompanies the hyperemia and inflammation of the gall-bladder wall.

These stones are grayish or brownish in color, depending on the proportion of pigment contained. The surface is smooth and there is no translucent zone about the periphery. The cut section shows the characteristic layer formation of this type of stone.

Two generations of stones may be suspected when we find pure calcium stones and some which have a cholesterin nucleus with a calcium coating, as the pure calcium stones were probably formed at the same time that the layers of calcium were deposited on the noninflammatory nucleus.

It is a mistake to think that only those gall bladders which show gross pathological changes are capable of producing symptoms. Severe symptoms may result from gall bladders which appear normal on macroscopic examination but which show an abnormal change under the microscope. We must remember that the microscopical change represents but an early stage of the process.

The gall bladder in acute cholecystitis presents a thickening of the wall, which is due chiefly to the large quantity of exudate in the fibrous and subserous layers. The mucosa is also thickened and may show ulcerations and erosions. Luschka's crypts in the mucosa seem to be the hotbeds of the infiltration and inflammation. The saclike ends of these depressions contain débris and inflammatory material, and the inflammatory process around them decreases as one examines the tissues more remote from the crypts.

Fibrosis occurs at a later stage, chiefly in the fibrosa and subserosa, as these layers contain the most exudate. The muscular power of the wall is interfered with by the fibrosis and predisposes to future stagnation of bile. A gall bladder which has once harbored infection, may very easily become reinfected as the mucosa is already damaged; stones are probably present, the muscle of the wall is fibrosed and its driving power is diminished, and the bile itself may still harbor a low-grade infection.

The possible dangers are extension into the liver, perforation, formation of an exudate with subsequent adhesions and, perhaps, carcinomatous degeneration.

The gall bladder in chronic cholecystitis is small, shrunken, thick, and fibrosed. Deformities may be present if ulcers have healed by scar formation.

The cholangitis produces changes in the bile passages which, like those in the gall bladder, may vary from a simple microscopic infiltration to gangrene. The infiltrated walls lose their elasticity and their driving power. The mucosa becomes inflamed and thickened, thus narrowing the lumen. All of these factors are important in the production of bile stasis and icterus. Even a small stone may cause jaundice in these cases. By way of contrast it must be remembered that normally a stone with a diameter under 1 centimeter may pass through all of the ducts and into the duodenum without causing any symptoms, providing there is no inflammation. The possible complications are perforation, fistula formation, and scar, with resulting stenosis of the common duct. The liver frequently undergoes a cirrhosis and pericholecystitis occurs in about 80 per cent of the cases.

SYMPTOMS.

As before stated, a gallstone carrier, like a typhoid carrier, need not show any symptoms as long as there is no accompanying inflammation of the bile passages. When symptoms do occur they are the result of the infection rather than on the number, size, or nature of the stones.

Pain.—This is the most important symptom. Its onset is sudden in about one-half of the cases and it reaches its acme in a few hours.

It may be colicky, boring, or it may be a feeling of marked oppression in the epigastrium or right hypochondrium. The pain very often ceases abruptly after a few days and differs from ulcer pains in that it has no definite relation to the nature of the meals, is not much relieved by the intake of food or by vomiting, and by the fact that the painful area is not as sharply circumscribed as in peptic ulcer. As a rule, the pain is worse at night about two or three hours after the heavy meal. In women it may be worse just before the menstrual period and, as is well known, frequently makes its first appearance after pregnancy.

In cases of cholecystitis, or inflammation of the cystic duct, the pain occurs in the *right hypochondrium*, while in involvement of the common duct the pain is localized in the *midline*, *about 1 or 2 centimeters above the navel.* The acute attack of pain lasts a few days, and there may be complete relief or only mild pain, with symptoms of indigestion, in the intervals. Both the acute pains and those present during the dormant period are increased by bodily motion, and there is usually tenderness over the gall-bladder region, which is best brought out by bimanual palpation of the liver, with simultaneous pressure over the incisura.

According to Ortner, gall-bladder disease may cause a spasm of the pylorus or even of the entire stomach, which produces an actual colic of that organ even in the absence of any genuine pathology of the stomach. This may account for the many cases of left-sided or epigastric pain in disease of the gall bladder.

In long-standing hydrops or low-grade empyema of the gall bladder there may be a feeling of oppression, occurring chiefly at night, and which is accompanied by a slight tenderness over the gall bladder. These attacks may last several hours or days, with weeks of comparative rest.

Icterus.—This sign is present in about 70 per cent of the cases of cholangitis, 10 per cent of cholecystitis, and is absent in the noninflammatory stage of cholelithiasis. The cause usually lies in the hepatic or common ducts. It may be caused by bile obstruction resulting from inflammation of the larger ducts, by mechanical obstruction, or by functional disease of the liver cells, as in biliary cirrhosis, resulting from chronic bile obstruction. It is not necessary that a stone be present in order that icterus appear. The icterus usually comes on abruptly, about 12 hours after the onset of the colic, while in compression of the common duct by a tumor the onset is more gradual and the icterus persists. This rule is not absolute, as the compressing tumor may break down and allow the bile to flow through again. But when this intermittency occurs more than once it is very improbable that the underlying cause is a disintegrating tumor.

The degree of icterus depends upon the duration and severity of inflammation within the bile ducts. It lasts but a few days after the attacks have ceased, and it is well to suspect causes other than inflammation of the ducts when the icterus persists for a longer time. The possible causes of a prolonged icterus may be scar stenosis of the common duct, compression of this duct by a tumor, or plugging by a stone.

The following working rules of Kehr will be helpful in the diagnosis of icterus:

Severe icterus with a large, soft liver usually points to disease of the liver cells and the jaundice is functional; i. e., it is caused by a disturbed function of the liver cells.

Severe icterus with a large, hard, knoblike liver is usually caused by carcinoma of that organ.

Severe icterus with chills and fever and with a large painful liver is usually due to cholangitis.

Icterus with increasing or persisting pains, coming on after a cholecystitis has subsided, often means an extending cholangitis.

Constant or intermittent icterus with intermittent fever is usually due to cholangitis with stone in the common duct.

Icterus in acute cases, with a large gall bladder, may be due to compression of the common duct by the head of the pancreas which has become secondarily inflamed by way of the lymphatics. We must suspect a compressing malignancy in chronic cases.

Gall bladder.—The gall bladder may be enlarged as a result of inflammation or distention. Tenderness is usually present in the former and is absent when the gall bladder is distended as a result of compression of the common duct. A previous cholecystitis may, however, cause a fibrosis and prevent its enlargement.

The enlarged gall bladder is palpable as a round or sausage-shaped mass, reaching from under the lower edge of the liver, and it may be moved from side to side in a pendulum-like manner if no adhesions are present. It moves with respiration unless adherent, and when pressed against the posterior abdominal wall instantly returns to the anterior abdominal wall upon release of the pressure in contradistinction to a palpable kidney which remains on the posterior wall. Care must be taken that one does not mistake the rolled-up omentum for the gall bladder, as the former may be palpable as a hard, irregular, indistinctly outlined tumor mass in the gall-bladder region. A friction rub may be heard over the gall-bladder region if an exudate is present on its serous surface.

In this connection Kehr's rules are given, but it must be remembered that they are not infallible in all cases.

A large gall bladder, which is not tender and which is accompanied by icterus, usually means compression of the common duct, probably

at the papilla of Vater. Hydrops of the gall bladder may also show the same signs.

A large, tender gall bladder without icterus is usually caused by cholecystitis and may be empyemic.

A large gall bladder which is not tender and without icterus speaks for hydrops.

The gall bladder becomes shrunken and fibrosed in about 80 per cent of cases of chronic cholecystitis.

Stool.—The stools assume an ash-gray color in obstruction of the bile passages. Stones may be found in the stools in about 5 per cent of cases, but this is of no great practical value, as it does not give a clue to the really important question—the state of the inflammation within the bile passages. All that we can say is that a stone *was* present and *was* passed, but we are unable to determine if there are any remaining ones.

Fever.—Generally speaking, chills and fever are more frequent in cholangitis than in cholecystitis. Sweating is not marked in these cases. In old patients or those having a low-grade infection or chronic empyema of the gall bladder a series of intermittent chills or fever, occurring periodically, perhaps every two weeks, may be the only signs present. These chills and fever begin several hours after the evening meal. *The distinguishing point is that it occurs in the evening, while the chills and fever of malaria occur early in the afternoon.*

Other symptoms.—Enlargement of the liver is due to ascending infection and cirrhosis. The spleen is also enlarged at times, especially at the onset of the attack. A perihepatic rub may occasionally be heard in perihepatitis. Enlargement of the liver occurs chiefly when the bile ducts are involved, especially the common duct.

Dyspeptic symptoms are very frequently present; in fact, they may be the chief things about which the patient complains. Hyperacidity is common in the early stages and low acidity of the stomach is usually present after the gall bladder has undergone atrophy or after it has been removed. Vomiting may occur, even when there are no adhesions. The vomitus is often only of yellowish mucus and does not relieve the symptoms unless there is food stagnation. Diarrhea may be due to the infection of the intestinal mucosa or to the achylia which is often present in the older cases. The appendix may also become secondarily involved by a hematogenous or lymphatic spread of the infection from the bile tracts.

Pancreatic involvement is not uncommon in infection of the bile ducts and may be suspected when the stools become massive, silvery gray, and foul smelling. These stools may contain many neutral fat droplets. The preexisting symptoms of bile tract involvement

are exaggerated, and there may be pain or a palpable tumor mass in the left side of the abdomen.

DIAGNOSIS.

The diagnosis of stone as such is superfluous, but the recognition of infection and the inflammation of the gall bladder or bile ducts is the all-important point. The difficulties are many in those cases in which the course is mild or masked. The same is true in the cases without icterus or colic, especially in those patients who show only recurring attacks of chills and fever with tenderness over the gall bladder region lasting but a few days.

The following résumé is offered with a view of differentiating between involvement of the gall bladder and of the ducts:

Acute serous cholecystitis.—The gall bladder is enlarged, but not very tender, and the colic is not severe. There is little fever, icterus is absent, and there is no enlargement of the liver.

Acute purulent cholecystitis.—The symptoms are much like those in the serous form, only much more severe. Chills and fever are distinct, the gall bladder is enlarged, tender, and may be felt as a sausage-shaped mass extending from under the liver.

Chronic cholecystitis.—The symptoms depend on the virulence of the infection. The pains are sticking or boring, but seldom colicky during the quiet period. The gall-bladder region is tender, but the organ itself is shrunken and can not, as a rule, be palpated. Icterus and enlargement of the liver are present only when there is an accompanying cholangitis.

Hydrops of the gall bladder.—We find a large, rather freely movable gall bladder, which is neither tender nor accompanied by icterus. Fever is absent. We must suspect a malignant compression of the common bile duct if it occurs for the first time in an older patient, especially if there is an accompanying ascites.

Pericholecystitis or adhesions.—The patients usually give a history of previous trouble in the bile passages. The pain is worse on motion or filling of the stomach or intestines. There may be icterus and fever, but the main points in the diagnosis are the history, signs of stenosis of the upper gastro-intestinal tube, and X-ray examination.

Acute cholangitis.—The diagnostic signs are evidence of complete or partial stenosis of the common or hepatic ducts. In affections of the common duct we find colic in the midline just above the navel, icterus, large liver, and acholic stools.

Chronic cholangitis.—The icterus varies with the location of the obstruction, being marked if it is in the retroduodenal portion of the common duct, and of a lesser degree if it is in the supraduodenal part. The pain is milder in older patients. There may be only attacks of chills and fever without any local findings.

PROGNOSIS.

The ordinary mortality of cholelithiasis is about 3 per cent. Empyema of the gall bladder or ducts is fatal unless drainage is provided by some means. The chronic cases remain dormant in very many instances if the stomach and intestines are guarded against dietetic errors, but may even then light up with perforation, empyema, or carcinoma.

TREATMENT.

Medical treatment is indicated in the acute nonsuppurative cases, hydrops of the gall bladder, and in chronic cases in which the course is dormant or has shown but mild exacerbations. The object of this treatment is to counteract the cholesterin diathesis as far as possible, prevent bile stagnation, and to combat the existing infection. The stone may remain after the infection has subsided and may not cause any further trouble unless reinfection occurs. Medical treatment which aims to remove or dissolve the stone is useless. The following plan my be carried out:

Rest in bed.—Indicated only in infection or chronic cases, showing little tendency to become dormant. Bodily activity in the form of careful exercise is useful in cases where there is little infection but where there is considerable bile stagnation. We may help to maintain a constant outflow of bile by ordering frequent meals and keeping the bowels open.

Diet.—This will depend upon the condition of the stomach and intestine. We should take cognizance of an existing achylia and the various forms of intestinal dyspepsia by first examining the stomach contents and stools. It is also wise to ask the patient what foods agree best with him and to use that as a guide, remembering that early cases are apt to have hyperacidity and later ones achylia. Generally speaking, the diet should be bland, contain little cellulose, and the meals should be frequent in order to maintain a constant flow of bile. Early cases must avoid acids, as vinegar, spices, and very salty foods, cold drinks, strong coffee, raw fruit, and fresh bread. The chronic cases should avoid excess in meat, smoked meats, and fats, except butter.

Medical treatment.—The principle of this part of the treatment is to keep the gastrointestinal tract in as good condition as possible. A watering place, as Karlsbad, is perhaps the best. If this is impossible, the treatment may be given at home, as follows: A teaspoonful of Karlsbad salts is dissolved in a glass of hot water and taken in the morning on a fasting stomach. The patient remains in bed for about 30 minutes, and may then get up and have his breakfast. It may be necessary for him to stay in bed after meals with local

warmth over the gall-bladder region, if the case is more severe. If Karlsbad salts are not available, we may use pills of podophylin with extract of belladonna at night and about one-half teaspoonful of Vichy salts in a glass of hot water before meals. Symptomatic treatment is, of course, to be used where indicated.

Surgical treatment.—The indications for surgical treatment are chronic suppurative conditions of the gall-bladder and bile ducts, which are not amenable to medical treatment; acute, painful attacks, which are not relieved by internal measures; icterus, which is due to obstruction of the common duct and which lasts longer than five weeks; gangrene or purulent cholecystitis or perforation; and adhesions, interfering with neighboring organs.

HISTORICAL.

WITH ANSON TO JUAN FERNANDEZ.

PART I.

By W. M. Kerr, Lieutenant Commander, Medical Corps, United States Navy.

In the summer of 1739 it was foreseen in England that a war with Spain was inevitable. Trouble had been brewing between these two great European powers for some time, and the war was the outcome of long-existing differences, of petty insults, and of irritating reprisals. British strategists of that period considered that Spain could be crippled most effectively by the destruction of her settlements along the coasts of North and South America and in the Philippines, which would result in cutting off her principal source of revenue, without which she would be unable successfully to carry on a war. Accordingly fleets were prepared to attack the settlements along the coast of the Spanish Main and on the Spanish Islands of the West Indies.

Sir George Wager, who was connected with the Admiralty in those days, devised a plan for sending two squadrons into the Pacific; one, in command of George Anson, the captain of H. M. S. *Centurion*, to proceed around the Cape of Good Hope to Manila; the other to pass around Cape Horn and, after reducing the settlements of the enemy on the western coast of the Americas, to cross the Pacific and join Anson's squadron at Manila. These vessels were expected to reach Manila before the news of the outbreak of war had arrived.

The English had reason to believe that the city of Manila might be in the same defenseless condition as the other Spanish settlements at that time, whose fortifications were neglected and in many places decayed, with cannon dismounted or useless from the rotting of their wooden carriages, with magazines and storehouses empty, with garrisons unpaid and dispirited. Panama was known to be in this condition; Manila, being far away, in all probability would have fortifications more neglected, and, as its trade was a rich one, the city would be a desirable prize.

In January, 1740, this plan went amiss, but the Admiralty determined to send Anson with a squadron around Cape Horn into the Pacific, and as soon as he received his commission as commodore of the squadron selected for this purpose he set to work getting his vessels ready for sea. Anson had no difficulty getting stores or pro-

visions for his venture, but he experienced great difficulty in procuring men. Several fleets commanded by influential admirals were fitting out, and these officers got the pick of the men available. For his landing forces to be used in attacking the Spanish towns he had been promised 300 trained soldiers in addition to "Bland's Regiment of Foot," which was composed of seasoned fighting men, commanded by able officers; but they were diverted into other military channels, and when the date of his expected sailing approached Anson lacked his landing force and 300 able seamen.

The royal fleets in those days were manned by various expedients. A certain proportion of the man-of-war's men came to sea as boys and remained in the service all their lives, partly because they were too strictly kept to escape and partly because the life unfitted them for anything else. A large number joined the navy because their heads had been turned by the guile of recruiting officers, and very bitterly they repented their folly after a while on board. A number came from merchant ships, attracted by the high rewards offered for seamen who volunteered to ship in His Majesty's service. But the greater number came unwillingly by impressment or from the Lord Mayor of London.

My Lord Mayor's men, as they were called, were generally young bloods who had been found drunk in the streets and dreaded the publicity of the police court or rogues or thieves which the magistrates considered safer at sea than at large in the towns.

The press gang that managed the process of impressment was a detachment of seamen in the command of a naval officer who were empowered in time of war to take any seafaring men and oblige them to serve on board the King's ships. The seamen who served in the press gang were sometimes rewarded with head money to make them more zealous in their duty.

"Having secured a number of reliable sailors from the merchant ships and sailors' taverns, the commanders of men-of-war fitting out filled up their complements by taking any men they could get. The press gang brought in a number of wretches found in the streets after dusk. It did not matter whether they were married men with families, tradesmen with businesses, or young men studying for professions. All was fish that came to the press gang's net. The men were roughly seized—often, indeed, they were torn from their wives by main force and knocked on the head for resisting, and so conveyed on board, whether subject to impressment or not. They could count themselves lucky if their neighbors came to the rescue before the press gang carried them off. When once they were aboard they were little like to get away again, for though they had permission to 'state the case' if they thought themselves illegally seized, the letters of appeal were seldom successful."

John Masefield, in his delightful book, "Sea Life in Nelson's Time," from which the preceding paragraph is quoted, says: "We live at a convenient distance from those times, and regard them as glorious—'the iniquity of oblivion blindly scattereth her poppy.' Man is always ready to ignore the pounds of misery and squalor which go to make each pennyweight of glory. Our naval glory was built up by the blood and agony of thousands of barbarously maltreated men. It cannot be too strongly insisted on that sea life, in the eighteenth century in our Navy, was brutilizing, cruel, horrible; a kind of life now happily gone forever; a kind of life which no man to-day would think good enough for a criminal. There was barbarous discipline, bad pay, bad food, bad hours of work, bad company, bad prospects. There was no going ashore till the ship was paid off, or till a peace was declared. The pay was small at the best of times, but by the time it reached the sailor it had shrunken to half or third of the original sum. The sailor was bled by the purser for slops and tobacco, by the surgeon for ointments and pills, and by the Jew who cashed his pay ticket."

Without a doubt Anson's squadron was manned by all these means, yet he had not sufficient men to work his ships. He did manage to get 32 seamen from a hospital, 37 from a prison ship, and 98 newly recruited marines, who were ignorant of sea life. Anson and his friends besought the Admiralty for a landing force, and in response to their pleadings the authorities resorted to an expedient rather unique in naval history. They ordered old soldiers, the out-pensioners of Chelsea Hospital, to sea! Five hundred of these aged veterans were drafted to form the landing force of the squadron!

As Richard Walter, chaplain of His Majesty's ship *Centurion*, who has left us the account of Anson's expedition, tells us: These out-pensioners were soldiers "who from their age, wounds, or other infirmities, were incapable of service in marching regiments." They were indeed poor material for Anson's squadron. The greater part of them would perish long before they arrived at the scene of action, as the passage around Cape Horn would be made in the most rigorous season of the year.

Anson and his friend, Sir Charles Wager, protested at the Admiralty against this draft; they were told "that persons who were supposed to be better judges of soldiers thought them to be the properest men that could be employed on this occasion." History does not tell us what Anson said to Sir Charles when they had left the Admiralty, but the use of strong language was a fine art in the eighteenth century.

The draft of soldiers from Chelsea Hospital came on board the vessels of the squadron August 5, 1740, but instead of 500 men only

259 reported. When the news of the draft spread through the hospital all those who had limbs and strength to hobble out of Portsmouth deserted, leaving behind their pension of 11 shillings 8 pence a month and their daily ration of beer and victuals. There remained for the squadron only those pensioners who were literally invalids, most of them well advanced in years, some 60 and some of them 70 years of age.

It is difficult to picture a more pathetic scene than the embarkation of these unhappy veterans. They had thought themselves free from the strife of war, free to spend their declining years in peace among the comforts of their asylum. Naturally they had no heart in the service in which they were now engaged; they were fully aware of all the dangers to which they would be exposed at sea, and without a doubt all had forbodings of the disasters which came to them before many months had passed.

Apprehension of misfortune was strongly marked on the face of each old man as he carried his belongings over the side of the vessel to which he had been assigned, and many an old fellow gave vent to his indignation at being hurried from his repose into "a fatiguing employment in which, in all probability, he would perish by lingering and painful disease without seeing the face of the enemy or in the least promoting the success of the enterprise," an indignation made more pronounced by the fact that he had "spent the activity and strength of his youth in his country's service."

Chaplain Walter makes this comment on the melancholy incident: "How extremely unfortunate it was, both to this aged and diseased detachment, and to the expedition they were employed in; that among all the out pensioners of Chelsea Hospital, which was supposed to amount to 2,000 men, the most crazy and infirm only should be called out for so fatiguing and perilous an undertaking. For it was well known that however unfit invalids in general might be for this service, yet by a prudent choice there might have been found among them 500 men who had some remains of vigor left. Anson fully expected that the best of them would be allotted him, whereas the whole detachment that was sent to him seemed to be made up of the most decrepid and miserable objects that could be collected out of the whole body, and by the desertions * * * these were a second time cleared of that little health and strength which were to be found among them, and he (Anson) was to take up with such as were much fitter for an infirmary than for any military duty."

The squadron left England on the 18th of September, 1740. It sailed "with land forces composed of 470 invalids and newly raised marines, one part of them incapable of action by age and infirmities, the other part useless by their ignorance of their duties." On the 21st

of September the vessels were clear of the land. Contrary winds persisted and made the passage to Madeira 40 days in length. Here Anson remained a week "taking on water and as much wine and other refreshments" as his vessels could carry. On the 3d of November the ships left Madeira and set their course for St. Catherines, an island on the coast of Brazil.

Viewed from without a warship of Anson's time appeared ponderous and cumbersome. But when the great sails were set and the hull began to move through the water the cumbrous bulk took on attributes of beauty and nobility. There has been, perhaps, no more beautiful thing on the sea than an old 74-gun ship under full sail.

Masefield has given us a verbal picture of the war vessels of that period. The ships had bulging wooden sides, vast stern works, and cumbrous wooden beak heads. There was no uniformity in painting the ships. The captains used their own discretion and followed their own tastes in the selection and application of the colors often with bizarre effects. The stern works were generally elaborate with gilded carving, gilt cherubs, and with red, blue, green, and gold devices, such as cornucopias, drums, and banners, royal arms, and wreaths. Round the stern of each ship, outside the glazed cabin windows, ran a quarter gallery or stern walk for the captain. Some large ships had two or three galleries. Right at the stern of the ship, inclining outboard over the sea, was a flagstaff on which flew an ensign as large as a mizzen-topgallant sail. Below the step of this flagstaff was a heavy lantern or stern light with a ponderous and decorated case. At the bow, at the extremity of the great beak head, was the ship's figure head, either a ramping red lion or a plain white bust or a shield or some allegorical figure suggested by the name of the ship. Along the sides of the ship were two or three rows of square gun ports, depending on the number of decks the ship had, and above the spar deck towered three masts supporting a maze of rigging and canvas.

The lower gun deck was the berth deck where the men slung their hammocks at night and where they ate their meals. The place was very dark and noisome in foul weather, for a very moderate sea made it necessary to close the port lids so that at times the crew messed in semidarkness for days together. It was also very wet on that deck in bad weather, for no matter how tightly the ports were closed and no matter how much oakum was driven all around the edges of the lids, a certain amount of water would come in and accumulate and slop about as the ship rolled, to the discomfort of all hands. In hot climates the discomfort was aggravated by the shrinking of the deck planks and the opening of the seams of the deck above, so that any water coming onto that deck would drip

down upon the berth deck. Often in its passage it dripped into the sailors' hammocks and added yet another misery to their miserable lives.

When Anson's vessels had been at sea 17 days after leaving Madeira "the captains of the squadron reported that their ship's companies were very sickly, and it was their own opinion, as well as their surgeons, that it would tend to preservation of the men to let in more air between decks for their ships were so deep in the water they could not possibly open their lower ports." To promote better ventilation between decks Anson ordered "six air scuttles to be cut in each ship in such places as would least weaken it."

In writing of the squadron's approach to the Brazilian coast Chaplain Walter says: "We now began to grow impatient for a sight of land, both for the recovery of our sick and for the refreshment and security of those who as yet continued healthier. When we left England we were in so good condition that we lost but two men on board the *Centurion* in our long passage to Madeira. But in the run between Madeira and St. Catherines we have been very sickly, so that many died, and great numbers were confined to their hammocks, both in our ship and the rest of the squadron, and several of these past all hope of recovery. The disorders they in general labored under were such as are common to hot climates. Fever, a disease which was not only terrible in its first instance but even the remains of it often proved fatal to those who considered themselves ar recovered from it; for it always left them in a weak and helpless condition and usually afflicted with fluxes and tenesmus. And by our continuing at sea all our complaints were every day increasing, so that it was with great joy that we discovered the coast of Brazil on the 18th of December."

The squadron came to anchor at St. Catherines three days later. "Our first care after mooring ship," continues the chaplain, "was to send our sick men ashore, each ship being ordered by the commodore to erect two tents for that purpose: one for the diseased, one for the surgeon and his assistants. We sent about 80 sick from the *Centurion*, and the other ships sent nearly as many in proportion to the number of their hands. As soon as we had performed this necessary duty we scraped our decks and gave our ship a thorough cleaning; then smoked it between decks, and after washed every part well with vinegar. These operations were extremely necessary for correcting the noisome stench on board and destroying the vermin; for from the number of our men, the heat of the climate, both these nuisances had increased upon us to a very loathsome degree, and, besides being most intolerably offensive, they were doubtless in some sort productive of the sickness we had labored under for a considerable time before our arrival at this island."

That St. Catherines afforded an abundant supply of fresh food is pparent from Chaplain Walter's account. He mentions pineapples, eaches, grapes, oranges, lemons, citrons, melons, apricots, onions, nd potatoes as thriving in that locality. Fish were plentiful and ere easily caught in "a great number of small, sandy bays very onvenient for haling the seyne." He comments on the water of the sland, which he declares was "excellent and preserves at sea as well s that of the Thames. For after it has been in the cask a day or wo it begins to purge itself, and stinks most intolerably, and is soon overed with a green scum. But this in a few days subsides to the ottom and leaves the water as clear as crystal and perfectly sweet."

Delightful as this island appeared to be, there were certain disdvantages attendant on a sojourn upon it. The writer tells us that all night and a great part of the morning a thick fog covers he whole country and continues till either the sun gathers strength o dissipate it or it is dispersed by a brisk sea breeze. This renders he place close and humid and probably occasioned the many fevers nd fluxes we were there afflicted with."

"All day," he continues, "we were pestered with great numbers of uscatos, which are not unlike the gnats in England, but more enemous in their stings." Here Chaplain Walter uttered a great ruth, but he did not realize its full significance. After leaving this sland, diseases transmitted by the "muscatos" might have been the ause of some of the sickness which prevailed on the ships.

Anson remained at this place about a month. After the ships had een overhauled and the squadron was ready for sea, the tents on hore were struck and the sick men were returned to their vessels. During that month the *Centurion* alone "had buried no less than 28 ien, yet the number of her sick was in the same interval increased rom 80 to 96"—a melancholy proof of the unhealthfulness of the lace.

The squadron sailed south, and the little vessels for a time enountered nasty weather—a foretaste of what was to come. Squalls f rain and wind, fogs, wet decks, all contributed to the discomfort f the men.

On the 7th of March the entrance of the Strait of Le Marie, beween Terra del Fuego and Staten Island, was reached. The vessels ntered the strait with fair weather and a brisk gale. Cape San Diego and the adjacent portion of Terra del Fuego towered above hem, "appearing of a stupendous height" and covered everywhere vith snow; yet the sun shone brightly and the day was warm.

We can imagine all hands upon deck gazing at the scene and congratulating themselves upon a safe passage around Cape Horn, for s Chaplain Walter tells us: "These straits are often considered the oundary between the Atlantic and the Pacific, and as we presumed

we had nothing now before us but an open sea till we arrived on those opulent coasts where all our hopes and wishes centered, we could not help flattering ourselves that the greatest difficulty of our passage was now at an end and that our most sanguine dreams were upon the point of being realized; hence we indulged our imaginations in those romantic schemes which the fancied possession of the Chilean gold and Peruvian silver might be conceived to inspire. These joyous ideas were heightened by the brightness of the sky and the serenity of the weather, which was indeed most remarkably pleasing, for though the winter was now advancing apace, yet the morning of this day in its brilliancy and mildness gave place to none we had seen since our departure from England. Thus animated by these delusions we traversed these memorable straits ignorant of the dreadful calamities that were then impending and just ready to break upon us; ignorant that the time drew near when the squadron would be separated, never to unite again; and that this day of our passage was the last cheerful day that the greatest part of us would ever live to enjoy."

EDITORIAL.

UNITED STATES NAVAL MEDICAL BULLETIN.

With this issue the UNITED STATES NAVAL MEDICAL BULLETIN enters the sixteenth year of its existence. First issued in 1907 as a quarterly bulletin designed for "the timely distribution of such information as seemed of value to the medical officers and the Hospital Corps in the performance of their duties," the periodical has served a useful purpose; but it is felt by those now responsible for its production that the time has arrived when some modifications in its issue and of the material published would be acceptable to its readers.

In the future the Notes on Preventive Medicine for Medical Officers, United States Navy, which are issued by the Division of Preventive Medicine of the Bureau of Medicine and Surgery, will be merged with the BULLETIN for reasons of economy, and the combined journals will be issued monthly.

It is contemplated, eventually, to lessen the space allotted to original articles on subjects of general medical interest and to encourage the production of papers of particular or peculiar interest to the medical officers of the service. Similarly in the section devoted to abstracts of current medical literature, it is intended to limit the reviews to articles having unusual importance or of special interest to the service, such as those written by naval medical officers, or on naval hygiene, on tropical medicine or medical zoology, or of medico-military concern.

Papers especially desired for publication in the BULLETIN are those dealing with the subjects of organization, administration, medico-military problems, naval hygiene and preventive medicine, tropical medicine and parasitology, aviation and gas defense, submarine problems, suggested devices and laboratory procedures, clinical notes, or any subject peculiarly of naval interest.

In this connection it is earnestly requested that all articles prepared for publication by medical officers be intrusted to the Bureau for disposition, even though it is desired to publish them elsewhere than in the BULLETIN. The Bureau is prepared to act as a clearing house for all manuscripts, being in closer communication with the larger medical journals of the country than is the individual officer and therefore in a better position to place those articles not adapted for use in the BULLETIN where they may receive the widest circula-

tion. Usually endeavor will be made to place an article with the journal to which, by its character, it is best suited; but if an officer requests that this article appear in any particular journal, it will be submitted to that journal first. Full abstracts of these articles, of service origin but published in other periodicals, will appear in the BULLETIN.

The Bureau is striving to keep in close touch with the Naval Medical School and has increased, for this purpose, the scope of the Division of Publications, which in the future will be known as the Division of Instruction and Publications, and it is believed that the cooperation of the faculty of the school in the preparation of timely editorials, book reviews, and the preparation of abstracts will be of great benefit to the BULLETIN.

A section of "Nursing and Dietetics" will probably be inaugurated, with space for instructions for nurses, items of interest to the Nurse Corps, recent details, etc.

A new feature of the BULLETIN will be a "Department of Queries," which should prove of value to the service at large and indirectly to those engaged in instruction who are seeking indications as to where instruction is needed and in what subjects. Medical officers are invited to submit queries and to present their problems to the BULLETIN, which, being in a position to draw on varied and extensive sources of information such as are not available elsewhere, will use every means of securing authoritative opinion. All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

ON A CORRESPONDENCE COURSE FOR NAVAL MEDICAL OFFICERS.

There has been established at the Field Officers' School, Marine Corps Schools, Marine Barracks, Quantico, Va., a correspondence course for field officers, and in a circular letter addressed to officers enrolling for the course and outlining the purpose of the course and the policy of the schools, Major S. N. Raynor, United States Marine Corps, in charge of the course, states in part: "The tactical doctrine which this school will endeavor to impart will be the American doctrine—the product of our own thought and experience. Therefore there will be no need to quote as authority teachings from French, British, or other foreign manuals and pamphlets. While there is no objection to utilizing the incidents of foreign campaigns as examples, the tactical doctrine deduced therefrom must be along tactical lines as taught at the Leavenworth schools.

"It must be born in mind, however, that while we must be guided by the Army in our tactical doctrine, this is a Marine Corps school, and in order that its character as such may develop and grow as the

school matures, the peculiarity of the duties of the Marine Corps and its distinctive characteristics must be kept in mind. The Marine Corps must always cooperate readily and harmoniously with the Navy. This demands that we foster in the schools intimate relations with the Navy and encourage a greater interest in naval affairs and more extensive knowledge of naval problems. We shall rely on the assistance and cooperation of the Naval War College to further this policy. *We believe that this course offers many advantages to medical officers of the Navy, particularly those serving with the Marine Corps in the field, and extend a hearty invitation to enroll to any and all of such who care to do so.*"

In response to a request for further particulars regarding the course, Major Raynor writes as follows:

"The duties required of medical officers on board naval vessels and at shore stations in the United States are totally different from those required when serving with the Marine Corps in the field, where, during active operations, aid stations, dressing stations, field and base hospitals must be established, and problems of evacuation must be solved.

"The staff problems connected with a military force in the field are complicated ones—much more so than those presented on board ship, and require a high degree of initiative on the part of all staff officers and in whom must be centered a great deal of responsibility. The senior medical officer of any military organization is a technical advisor to his commanding officer, and upon him rests the responsibility for the coordination of all the medical units assigned to the command, their disposition to most effectively serve the combatant troops, and the procurement and issue of medical supplies in adequate quantities.

"To perform these duties most efficiently requires a more or less intimate knowledge of the organization of the combatant units; their tactical dispositions under varying conditions; familiarity with the organization of the Medical Corps units best calculated to meet the demands made upon them; and a knowledge of topography and tactics.

"In time of peace the only means available to the average officer for acquiring this knowledge lies in the solution of map problems. The general purpose of medico-military map problems is to invite attention to the varying conditions and factors which might influence the management of the Medical Corps units serving with troops in the field. The correctness of the solutions rendered is of relatively small importance. Such solutions merely apply to individual concrete case; but the solution of a sufficient number of problems demonstrates broad general principles upon which the *efficient* solution of

such problems or the handling of actual situations liable to be encountered in the field must depend. The practical value of map problems lies in the stimulation of thought along lines ordinarily relatively unfamiliar.

"Our course, as at present laid out, does not include any special problems for the medical officers. However, should the number of applications for enrollment received from medical officers warrant a modification of our schedule, we would be very glad to prepare a series of special medico-military map problems. These problems would be progressive in nature and would be preceded by a brief course in map reading and military organization.

"Officers enrolling for the course would be required to provide themselves with the following maps, which may be purchased from the book department, General Service Schools, Fort Leavenworth, Kans.:

"General map, Gettysburg-Antietam ($0.10).

"Gettysburg-Antietam, 3-inch map, 12 quadrangles, either mounted together on muslin ($3) or mounted singly ($0.25) each, or single unmounted sheets ($0.05 each), at their option.

"Geological Survey map of Gettysburg and vicinity, 1:62,500, 6 sheets, mounted together on muslin ($1.50)."

Some years ago the writer of this note, while at sea, took the correspondence course for medical officers given at the Army Field Service School for Medical Officers, at Fort Leavenworth, Kans., and found it interesting and instructive, and he can heartily recommend the correspondence course given at the Field Officers' School by the United States Marine Corps to any medical officer who may be interested in this instruction.

ON THE DANGER OF USING STRONG SOLUTIONS OF PHENOL IN THE EAR.

When the practice of antiseptic surgery was in its youth, surgeons encountered a condition following the use of dressings moistened with a solution of carbolic acid, which came to be known as carbolic-acid gangrene. So frequently was this condition encountered that many warnings against the use of solutions of carbolic acid as a wet dressing appeared in the medical literature, and the employment of this remedy fell into disuse. Pautrier, writing in the Presse Médicale for March 2, 1907, claimed that a solution of carbolic acid in glycerine never causes gangrene, and Ballenger, in his Diseases of the Nose, Throat, and Ear, when discussing the relief of pain in acute otitis media, makes the following statement: "A mixture of equal parts of carbolic acid, glycerine, and the hydrochlorate of cocaine may be dropped into the external meatus, where it will, in most cases, afford relief within a few minutes."

"Another remedy of value for the relief of pain as well as of the ongestion is a 12 per cent solution of carbolic acid in glycerine. While this solution does not have as great an anesthetic power as he one above recommended, it nevertheless aids materially in allay-ng the pain."

In spite of the recommendation of this authority, the practice of sing phenol in the ear is not devoid of danger. A report received y the Bureau of Medicine and Surgery from one of our large naval ospitals indicates that a great number of hospital corpsmen, espe-ally those on independent duty, are in the habit of employing phe-ol or strong mixtures thereof in the external auditory canal for the lief of pain in this locality. Members of the Hospital Corps should e advised against the use of phenol in this connection, as serious urns and retarded healing have followed this practice.

IN MEMORIAM.

ANDREW REGINOLD WENTWORTH.

1859–1921.

Captain Andrew Reginold Wentworth, Medical Corps, United States Navy (retired), died on April 13, 1921, at the United States Naval Hospital, Portsmouth, N. H. His remains were interred in Orchard Grove Cemetery, Kittery, Me. He was the son of Andrew Pepperrill Wentworth and Sarah Jones Wentworth and was born on October 19, 1859, at Kittery.

Captain Wentworth received his early education in the grammar and high schools of Kittery, Me., and New Hampton, N. H. He taught school for a while in his native town and later studied medicine with his uncle, Dr. Mark F. Wentworth, a well-known physician in his day. After a few years of preliminary study he entered Bowdoin Medical School and later Dartmouth Medical College, where he received the major part of his medical education, graduating from Dartmouth in November, 1884.

On November 27, 1884, Captain Wentworth married Adelaide E. Birdsall, who survives him. Two children were born of this union—Amy, on July 23, 1886, and Margery P., on December 4, 1894.

He entered the Medical Corps of the United States Navy as an assistant surgeon on April 22, 1885, and was assigned to duty at the navy yard, Portsmouth, N. H. Three years later he was promoted to the grade of passed assistant surgeon, and in the course of time to the grades of surgeon, medical inspector, and medical director, attaining the latter grade on December 29, 1912.

While serving in this grade with the rank of captain, and in command of the United States Naval Hospital, Bremerton, Wash., he suffered a stroke of apoplexy on March 31, 1918. He was retired from active service February 7, 1919, by reason of physical disability contracted in the line of duty and returned to the home of his boyhood days, Kittery.

During Captain Wentworth's naval career of nearly 36 years he served on many warships and at numerous shore stations. Among the latter were the stations at New York; Norfolk, Va.; Bremerton, Wash.; Mare Island, Calif.; Annapolis, Md.; and Portsmouth, N. H. He was the medical officer of the U. S. S. *Atlanta* when that vessel

made a cruise around the world with the famous White Squadron. At the time of the Spanish-American War he was the surgeon of the U. S. S. *Marblehead*. He was the senior medical officer of the U. S. S. *Louisiana* during the world cruise of the Atlantic Fleet in President Roosevelt's administration.

Those whose privilege it was to serve with Captain Wentworth will remember him as kindly gentleman, a skilled physician, and an able officer. He was a credit to the Medical Corps of the United States Navy and an honor to the country in whose service his professional life was spent.

HONORS AND DISTINCTIONS.

During the year 1920 the following honors and distinctions were conferred upon members of the Medical Department of the United States Navy:

MEDICAL OFFICERS.

NAVY DECORATIONS AND COMMENDATORY LETTERS.

Alberty, Watie M., Lieutenant (M. C.), U. S. N.	Special letter of commendation.
Andrews, Edward D., Lieutenant (M. C.), U. S. N.	Do.
Bell, William H., Captain (M. C.), U. S. N.	Do.
Biddinger, Aretas E., Lieutenant (M. C.) U. S. N. R. F.	Do.
Blackwood, James D., Lieutenant (M. C.), U. S. N.	Navy Cross.
Blackwood, Norman J., Captain (M. C.), U. S. N.	Do.
Bogert, Edward S., Captain (M. C.), U. S. N.	Do.
Boone, Joel T., Lieutenant Commander (M. C.), U. S. N.	Medal of Honor.
Braisted, William C., Rear Admiral (M. C.), U. S. N.	Distinguished service medal.
Bugbee, Edwin P., Lieutenant (M. C.), U. S. N.	Special letter of commendation.
Butler, Charles S., Captain (M. C.), U. S. N.	Do.
Carr, George P., Lieutenant (M. C.), U. S. N.	Do.
Chapman, Herbert S., Lieutenant (M. C.), U. S. N.	Do.
Clemmer, Leon, Lieutenant (M. C.), U. S. N. R. F.	Do.
Clifton, Alfred L., Lieutenant Commander (M. C.), U. S. N.	Do.
Coleman, Herbert R., Lieutenant (M. C.), U. S. N.	Do.
Cram, George E., Lieutenant (M. C.), U. S. N. R. F.	Navy Cross.
Crandall, Rand P., Captain (M. C.), U. S. N.	Special letter of commendation.
Crosby, Paul T., Lieutenant (M. C.), U. S. N.	Navy Cross.
Curl, Holton C., Captain (M. C.), U. S. N.	Do.
Decker, Corbin C., Commander (M. C.), U. S. N.	Special letter of commendation.
Dennis, John B., Captain (M. C.), U. S. N.	Do.
Dessez, Paul T., Commander (M. C.), U. S. N.	Navy Cross.
De Valin, Charles M., Captain (M. C.), U. S. N.	Do.
Dickinson, Dwight, Lieutenant (M. C.), U. S. N.	Do.
Dubois, Eugene F., Lieutenant (M. C.), U. S. N. R. F.	Do.

Farenholt, Ammen, Captain (M. C.), U. S. N.	Special letter of commendation.
Farwell, Wrey G., Commander (M. C.), U. S. N.	Navy Cross.
Field, James G., Captain (M. C.), U. S. N.	Special letter of commendation.
Field, Thomas M., Lieutenant (M. C.), U. S. N. R. F.	Do.
Fiske, Charles N., Captain (M. C.), U. S. N.	Navy Cross.
Flautt, Jesse A., Lieutenant (M. C.), U. S. N. R. F.	Do.
Freeman, George F., Captain (M. C.), U. S. N.	Do.
Garrison, Harry A., Lieutenant Commander (M. C.), U. S. N.	Do.
Garton, Will M., Commander (M. C.), U. S. N.	Special letter of commendation.
Gill, James E., Commander (M. C.), U. S. N.	Navy Cross.
Gill, William T., Lieutenant (M. C.), U. S. N.	Do.
Grimland, Gordon A., Lieutenant (M. C.), U. S. N.	Do.
Grow, Eugene J., Captain (M. C.), U. S. N.	Do.
Harris, Jack H., Lieutenant (M. C.), U. S. N.	Special letter of commendation.
Hart, Lynn N., Lieutenant (M. C.), U. S. N.	Do.
Holcomb, Richmond C., Commander (M. C.), U. S. N.	Navy Cross.
Homer, Warren D., Lieutenant (M. C.), U. S. N.	Special letter of commendation.
Hook, Frederick R., Lieutenant (M. C.), U. S. N.	Navy Cross.
Huffman, Lester D., Lieutenant (M. C.), U. S. N.	Do.
Iverson, Louis, Lieutenant (M. C.), U. S. N.	Do.
Kennedy, Robert M., Rear Admiral (M. C.), U. S. N.	Do.
King, Ogden D., Lieutenant (M. C.), U. S. N.	Do.
Lawler, Robert J., Lieutenant (M. C.), U. S. N. R. F.	Do.
Leys, James F., Captain (M. C.), U. S. N.	Special letter of commendation.
Locy, Francis E., Lieutenant (M. C.), U. S. N.	Navy Cross.
Lung, George A., Captain (M. C.), U. S. N.	Special letter of commendation.
Lyle, Alexander G., Lieutenant Commander (M. C.)., U. S. N.	Medal of Honor.
McCormick, Albert M. D., Rear Admiral (M. C.) U. S. N.	Special letter of commendation.
McCullough, Frank E., Commander (M. C.), U. S. N.	Navy Cross.
McLendon, Preston A., Lieutenant (M. C.), U. S. N.	Do.
Mack, Cornelius H., Lieutenant Commander (M. C.), U. S. N.	Do.
Mann, William, Jr., Lieutenant Commander (M. C.), U. S. N.	Special letter of commendation.
Michael, William H., Lieutenant Commander (M. C.), U. S. N.	Navy Cross.
Moring, Travis S., Lieutenant (M. C.), U. S. N.	Do.
Morris, Laird M., Lieutenant (M. C.), U. S. N. R. F.	Special letter of commendation.
Mueller, Robert, Lieutenant (M. C.), U. S. N.	Navy Cross.
Murphy, John F., Commander (M. C.), U. S. N.	Special letter of commendation.

Murphy, Joseph A., Captain (M. C.), U. S. N.	Navy Cross.
Ohnesorg, Carl, Captain (M. C.), U. S. N.	Special letter of commendation.
Old, Edward H. H., Commander (M. C.), U. S. N.	Navy Cross.
Pearce, Warren F., Lieutenant (M. C.), U. S. N. R. F.	Special letter of commendation.
Petty, Orlando H., Lieutenant (M. C.), U. S. N.	Medal of Honor.
Pickrell, George, Captain (M. C.), U. S. N.	Special letter of commendation.
Pleadwell, Frank L., Captain (M. C.), U. S. N.	Do.
Plummer, Ralph W., Commander (M. C.), U. S. N.	Do.
Pratt, Lester L., Lieutenant Commander (M. C.), U. S. N.	Navy Cross.
Pratt, Malcolm L., Lieutenant (M. C.), U. S. N.	Do.
Pruett, John F., Lieutenant (M. C.), U. S. N. R. F.	Special letter of commendation.
Randall, James A., Commander (M. C.), U. S. N.	Do.
Redden, William R., Lieutenant (M. C.), U. S. N.	Navy Cross.
Rhoades, George C., Lieutenant Commander (M. C.), U. S. N.	Special letter of commendation.
Rice, Estill L., Lieutenant (M. C.), U. S. N. R. F.	Navy Cross.
Richardson, Royall R., Commander (M. C.), U. S. N.	Special letter of commendation.
Ross, George C., Lieutenant (M. C.), U. S. N. R. F.	Navy Cross.
Shea, Richard O., Lieutenant (M. C.), U. S. N.	Do.
Shinn, Herbert L., Lieutenant (M. C.), U. S. N.	Do.
Snyder, John J., Commander (M. C.), U. S. N.	Special letter of commendation.
Stitt, Edward R., Rear Admiral (M. C.) U. S. N.	Navy Cross.
Strine Howard F., Commander (M. C.), U. S. N.	Do.
Talley, James E., Lieutenant Commander (M. C.), U. S. N.	Special letter of commendation.
Terry, Jack S., Lieutenant (M. C.), U. S. N.	Navy Cross.
Thompson, Edgar, Commander (M. C.), U. S. N.	Do.
Traynor, Joseph P., Commander (M. C.), U. S. N.	Special letter of commendation.
White, George L., Lieutenant (M. C.), U. S. N.	Navy Cross.
Wright, Barton L., Commander (M. C.), U. S. N.	Special letter of commendation.

WAR DEPARTMENT DECORATIONS.

Fiske, C. N., Captain (M. C.), U. S. N.	Distinguished Service Medal.
McDowell, Ralph W., Lieutenant Commander (M. C.), U. S. N.	Do.
Snyder, J. J., Commander (M. C.), U. S. N.	Do.
Boone, Joel T., Lieutenant Commander (M. C.), U. S. N.	Distinguished Service Cross.
Dessez, Paul T., Commander (M. C.), U. S. N.	Do.
Dickinson, Dwight, Lieutenant (M. C.), U. S. N.	Do.
Farwell, Wrey G., Commander (M. C.), U. S. N.	Do.
Gill, W. T., Lieutenant Commander (M. C.), U. S. N.	Do.

Hook, Frederick R., Lieutenant (M. C.), U. S. N.	Distinguished Service Cross.
King, Ogden G., Lieutenant (M. C.), U. S. N.	Do.
McLendon, Preston A., Lieutenant (M. C.), U. S. N.	Do.
Michael, W. H., Lieutenant (M. C.), U. S. N.	Do.
Moring, Travis S., Lieutenant (M. C.), U. S. N.	Do.
Osborne, Weedon E., Lieutenant (M. C., D. S.), U. S. N.	Do.
Petty, Orlando H., Lieutenant (M. C.), U. S., N. R. F.	Do.
Pratt, Lester L., Lieutenant Commander (M. C.), U. S. N.	Do.
Shea, Richard O. B., Lieutenant (M. C.), U. S. N.	Do.
Stamps, Bernice B., Pharmacist, U. S. N.	Do.

FOREIGN DECORATIONS.

Bogert, E. S., Captain (M. C.), U. S. N.	Commander of the Order of the British Government.
Boone, Joel T., Lieutenant Commander (M. C.), U. S. N.	Croix de Guerre of France.
Clemmer, Leon, Lieutenant (M. C.), U. S. N.	Fatiche di Guerra of Italy, ribbon and brevet.
Crosby, Paul T., Lieutenant (M. C.), U. S. N.	French citation.
Curl, H. C., Captain (M. C.), U. S. N.	Officer of the Legion of Honor of France.
De Valin, C. M., Captain (M. C.), U. S. N.	Commander of the Order of the British Empire.
Freeman, George F., Captain (M. C.), U. S. N.	Officer of the Legion of Honor of France.
Gilmer, William P., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Grayson, C. T., Rear Admiral (M. C.), U. S. N.	Commander of the Legion of Honor of France.
Griffith, E. L., Lieutenant (M. C.), U. S. N. R. F.	Cross of Chevalier of the Crown of Italy.
Holladay, Gray G., Lieutenant (M. C.), U. S. N. R. F.	Chevalier of the Order of Leopold of Belgium.
Hook, Frederick R., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Iden, J. H., Captain (M. C.), U. S. N.	Officer of the Order of Leopold of Belgium.
Kerr, William M., Lieutenant Commander (M. C.), U. S. N.	Chevalier of the Order of St. Maurice and Lazarus of Italy.
Locy, Francis E., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Mack, Cornelius H., Lieutenant Commander (M. C.), U. S. N.	Do.
McDowell, R. W., Lieutenant Commander (M. C.), U. S. N.	Chevalier of the Legion of Honor of France.
McLendon, Preston A., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Melhorn, K. C., Lieutenant Commander (M. C.), U. S. N.	Haitien Medaille Militaire.
Moring, Travis S., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Patton, Fred J., Commander (M. C.), U. S. N. R. F.	Chevalier of the Order of St. Maurice and Lazarus of Italy.

Perkins, R. A., Lieutenant (M. C.), U. S. N. R. F.	Chevalier of the Crown of Italy.
Petty, Orlando H., Lieutenant (M. C.), U. S. N. R. F.	Croix de Guerre of France.
Pleadwell, Frank L., Captain (M. C.), U. S. N.	Commander of the Order of the British Empire.
Pratt, Lester L., Lieutenant (M. C.), U. S. N.	Croix de Guerre of France.
Shea, Richard O'B., Lieutenant (M. C.), U. S. N.	French citation.
Shiffert, Herbert O., Commander (M. C.), U. S. N.	Officer of the Order of the British Empire.
Thompson, Edgar, Captain (M. C.), U. S. N.	Do.

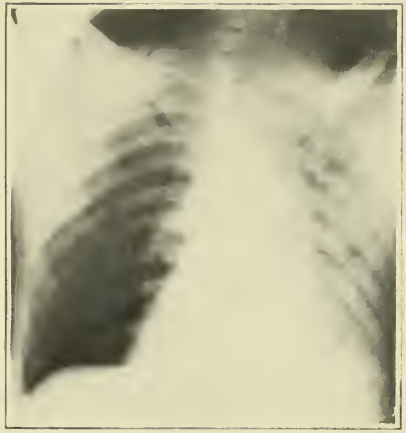
NAVY NURSES.

NAVY CROSS AND LETTER OF COMMENDATION.

Brooke, Elsie, Chief Nurse, U. S. N.	Letter of commendation.
Higbee, Lenah S., Superintendent Navy Nurse Corps.	Navy Cross.
Hidell, Marie, Reserve Nurse, U. S. N.	Do.
Leonhardt, Elizabeth, Chief Nurse, U. S. N.	Letter of commendation.
Murphy, Lillian M., Reserve Nurse, U. S. N.	Navy Cross.
Place, Edna E., Reserve Nurse, U. S. N.	Do.
Pringle, Martha E., Chief Nurse, U. S. N.	Letter of commendation.

HOSPITAL CORPSMEN.

Balch, John H., PhM–1c, U. S. N.	Medal of honor.
Brumbeloe, Algernon G., PhM–3c, U. S. N.	Navy cross.
Gates, Horatio D., CPhM, U. S. N. R. F.	Do.
Grauer, Earl S., PhM–3c, U. S. N.	Do.
Hayden, David E., HA–1c, U. S. N.	Medal of honor.
Johnson, Joseph F., PhM–3c, U. S. N.	Navy Cross.
Layton, Lester K., HA–1c, U. S. N.	Do.
Marks, John H., PhM–2c, U. S. N.	Do.
Miller, Carey F., Ha–1c, U. S. N. R. F.	Do.
Pilkerton, Alfred W., HA–1c, U. S. N.	Do.
Reister, Junius E., PhM–3c, U. S. N.	Do.
Roberts, Harold C., PhM–3c, U. S. N.	Do.
Whalen, Leveque L., HA–1c, U. S. N.	Do.
Anderson, Claude S., PhM–1c, U. S. N.	Letter of commendation.
Campbell, Clifton C., PhM–2c, U. S. N.	Do.
Clark, Thayer H., PhM–2c, U. S. N.	Do.
Kingsburg, Carl O., HA–1c, U. S. N.	Do.
McDaniel, Lee J., PhM–2c, U. S. N.	Do.
McGee, Henry E., HA–1c, U. S. N.	Do.
Mattingly, Claude, PhM–1c, U. S. N.	Do.
Morton, Roger Q., PhM–3c, U. S. N.	Do.
Nichols, Harland A., PhM–2c, U. S. N.	Do.
Norton, Donald C., PhM–3c, U. S. N.	Do.
Peterson, Otis A., PhM–2c, U. S. N.	Do.
Phelan, Francis, HA–1c, U. S. N.	Do.
Schaffner, Fred C., PhM–3c, U. S. N.	Do.
Smith, Emmet C., PhM–2c, U. S. N.	Do.
Stratford, Park C., PhM–2c, U. S. N.	Do.
Tibbitts, Frank O., PhM–2c, U. S. N.	Do.



I

II

III

Broncho-pneumonia.

CLINICAL NOTES.

BRONCHO-PNEUMONIA AND BRONCHOSTENOSIS FOLLOWING APPENDECTOMY.

By I. W. Jacobs, Lieutenant Commander, Medical Corps, United States Navy.

The patient was operated on for subacute appendicitis; 48 hours ater he was seized suddenly with a dry cough, pain in the right side f the thorax, dyspnea, and fever. Physical examination showed ome cyanosis and expiratory dyspnea. Percussion over the right ide of the chest anteriorly revealed dullness to flatness in the axilla nd toward the base of the lung. Breathing in this locality was of he broncho-vesicular type at the right apex, but breath sounds were bsent over the entire right chest.

Posteriorly there was flatness of the base extending upward and nerging into dullness which extended to the spine of the scapula. Breath sounds and tactile fremitus were absent over the entire right hest.

The left lung showed no involvement. The white blood count was 4,000, polymorphonuclears, 82 per cent. On culture of the sputum pneumococcus, Type IV (?) was grown. A blood culture was egative. The urine showed a slight trace of albumin.

Three X-ray plates were made at varying stages of the illness. The first one shows an extensive broncho-pneumonia involving the scending bronchus, the lung root, and the descending bronchus on he right side, making the diagnosis of broncho-pneumonia with ronchostenosis clear. The second plate, taken during resolution f the process, shows the hilus shadows on both sides slightly increased and a few calcified glands at both lung roots. The shadow f the ascending bronchus and the lung root on the right is seen, whereas in the first plate they were obliterated by the broncho-neumonic process. In the right lower lobe there is a shadow of ncreased density which dulls and obliterates the diaphragm and ostо-phrenic angle on that side; and it appears as though the right order of the heart is adherent in that region to the pneumonic rocess. The heart and the mediastinal contents are displaced to he right. This plate shows a resolving broncho-pneumonia with ossible adhesive pericarditis. The third plate was taken after the atient was convalescent one month. The shadow of the right lung oot and that of the right descending bronchus is increased and

prominent. The heart is now in its normal position and all signs of the pneumonic process and the adhesive pericarditis have disappeared.

The treatment employed was as follows: The patient was given a liquid and a soft diet representing 2,000 calories and plenty of fresh air. The intake of fluids was forced somewhat; he imbibed 8 ounces of water every two hours. The fluid intake and urine output was carefully observed. Morphine in doses of one-fourth grain was given as required to ease chest pain and expiratory dyspnea. The second day of the illness the pulse became rapid (140) and weak; for this digitan one-half grain every three hours and an ounce of whisky three times a day was given. Under this therapy the patient's condition rapidly improved and convalescence was uneventful.

REPORT OF FOUR SURGICAL CASES.

By J. J. A. McMULLIN, Lieutenant Commander, Medical Corps, United States Navy.

An unusually large number of interesting surgical cases have been treated at the League Island Naval Hospital during the past year. A few have been selected for detailed report. These cases while not unusual are not, I trust, entirely devoid of interest.

Case I.—H., H. J. Sea, U. S. Navy. Age, 19 years. Diagnosis, appendicitis, acute. Intestinal obstruction.

Patient was awakened at 2 a. m. December 11, 1920, with severe cramp-like pains in region of umbilicus; the pain later localized in the right iliac fossa, and just before admission to the hospital at 1 p. m., the same date, the pain almost entirely disappeared. Physical examination was negative, except for marked rigidity and tenderness over the region of the appendix. White blood count, 24,800. Temperature, 103.6°; pulse, 120; respiration, 28. Operation performed one hour after admission.

Operation. Ether. Started 2.20 p. m., finished 3.09 p. m. Low right rectus incision. Omentum and caecum severely inflamed. Appendix gangrenous; bound down in pelvis and ruptured into a pouch of omentum, which contained free pus. The base of the appendix was subserous. Appendix freed; meso-appendix clamped, cut, and ligated; appendix removed with cautery. Two drainage tubes inserted, one in the pelvis, the other to the stump of appendix. Wound closed in layers around tubes.

The patient when returned to bed received 1,000 cubic centimeters of tap water per rectum, and when he reacted from ether he was placed in Fowler's position and was given continuous proctoclysis for 48 hours.

December 17, 1920. Condition excellent; slight drainage; dressed daily, tubes removed.

January 8, 1921. Wound healed. Up and about.

February 2, 1921. Slightly underweight; no symptoms.

So far this patient progressed about as rapidly as could be expected and appeared to be fit for duty, when, on February 10, 1921, he was taken with severe pain in the upper abdomen. Physical examination showed abdomen distended and tender on deep palpation. No increased peristalsis; had natural bowel movement; chest clear. Temperature, 98°; pulse, 80; respiration, 18. The following day two enemas were given, but both were expelled clear; patient did not expel gas by bowel. Peristalsis increased; general tenderness upon deep palpation; distension somewhat increased. Could retain nothing in stomach. Realizing that this patient had been operated upon three months previously for acute perforated gangrenous appendicitis, we had a sufficiently clear picture of bowel obstruction to warrant immediate operation. There is no condition in surgery, except active hemorrhage, which so imperatively demands early operation. Authorities agree that operations performed in the first 12 hours should carry a mortality of approximately only 10 per cent. The mortality rate rises with each hour of delay. The operative mortality for all cases ranges between 50 and 75 per cent.

Bowel obstruction is one of the unfortunate complications of all abdominal operation, more particularly so following operations for appendicitis and pelvic conditions in the female, especially when drainage is necessary. Obstruction is usually in the small intestine and in the lower abdomen.

February 11, 1921. Operation. Ether. Started 12.23 p. m., finished 1.20 p. m. Preoperation diagnosis, acute intestinal obstruction.

Incision lower right rectus. A large quantity of fluid was found in the small intestine and the small bowel was found enormously distended above a point near the ileocaecal junction. Below this point the bowel was bound down firmly by adhesions and could not be freed; the small bowel below, also running into this mass, was collapsed. The blood circulation of the bowel was not markedly impaired, although the distended loops of bowel were darker in color than normal. No peristalsis was observed. A lateral anastomosis was made between the lower segments of distended bowel and the empty gut below. The distended small bowel was then turned out of the abdomen and drained of an enormous amount of foul contents and washed out with warm water. The abdomen was closed without drainage.

February 12. Patient passed gas and small amount of feces via rectum.

February 13. Small natural bowel movement.

February 14. Small bowel movement (enema).

February 15. Formed natural bowel movement.

February 16. Formed natural bowel movement.

February 17. Three natural bowel movements. Two stitches removed and a quantity of pus with fecal odor liberated.

February 28. Drainage freely from fecal fistula. Dressed several times daily. Patient had severe hemorrhage from depth of fistula, which was stopped by packing. This hemorrhage was probably due to erosion of a blood vessel.

March 16. Patient is up and about, feeling absolutely well; little discharge from fistula.

April 22. Fistula closed. No symptoms; gaining weight and strength. Bowels regular.

This patient was left with a weak abdominal wall occasioned by two operations requiring drainage. This weakness did not amount to a hernia. However, it was thought best to survey him from the service, and this was done very recently. The patient left the hospital looking and feeling perfectly well.

Case II.—W., A. N. Captain, U. S. Navy. Age, 63 years. Diagnosis, hypertrophy of prostate.

This patient first noticed frequency of urination about two years ago and was told by the physician who attended him that his prostate was enlarged. He had attacks of acute retention in September, 1919, and July, 1920.

Phenolphthalein elimination test was 38 per cent in first hour and 20 per cent in second hour. Blood urea estimation showed 13 milligrams per 100 cubic centimeters. The urine was negative, except for a medium cloud of albumin and a large number of pus cells. Residual urine, 2 ounces. Blood pressure—diastolic, 90; systolic, 120. The physical examination was entirely negative, except for uniform enlargement of the prostate, which was fairly high up, although the examining finger could reach to the upper border.

The question naturally arose regarding the advisability of a one or two stage operation. The presence of a long standing cystitis was not considered a contraindication for the one-stage operation. The phthalein output totaling 58 per cent, the low blood-urea estimation and the small amount of residual urine were factors which favored a one-stage operation.

October 15, 1920. Operation. Ether. Started 11.35 a. m. Operation finished 12.04 p. m.

Incision above pubis; muscles separated; bladder opened extraperitoneally; prostate moderately hypertrophied with a large middle

obe projected into the bladder across the internal meatus. Prostate nucleated with right forefinger, with left forefinger in rectum. Prostate cavity packed with gauze; drainage tube inserted and bladder sewed in two layers with No. 2 chromic gut; rubber dam drain to space of Retzius. Silkworm gut for skin. Indwelling catheter in urethra.

October 18: Up in wheel chair. Draining urine freely through supra-pubic tube.

October 24: Suprapubic drainage discontinued. Stitches removed; wound healed without infection.

October 25: Bladder fistula closed. Urethral catheter discontinued.

November 4: Patient given rubber urinal and discharged from hospital to complete convalescence at home.

Some weeks later this patient wrote that he has excellent vesical control and is entirely free of symptoms. He has written several times subsequently, stating that he has continued to remain well.

Case III.—J., C. Supernumerary. Age 24 years. Diagnosis, both bones of left leg nonunion.

This man was injured at Verdun October 5, 1918, a piece of shell striking the left leg and causing a fracture of both bones near the middle of the shafts. The next day he was operated upon at a base hospital. The wound drained four months, but has since remained closed. He was discharged from the Army in 1919 with a brace, which enabled him to get about with the aid of a stick.

When admitted to this hospital the X ray showed an old fracture of the fibula with slight overriding of the fragments and firm bony union and a dentate fracture near the middle of the shaft of the tibia with no bony union. Examination showed a scar 4 inches long over the left tibia. Fragments of the ununited tibia were movable. There was very marked atrophy of muscles of the leg. The patient was otherwise in excellent physical condition.

November 17: Operation. Ether. Operation started 10.16 a. m., finished 11.05 a. m.

The old scar was resected and the fibrous tissue uniting the fragments of tibia cut away. The edges of the fragments were in good position. A gutter was made in the left tibia 1½ inches above and the same distance below the fracture. This gutter was cut sufficiently large to accommodate a graft one-half inch in width. The graft was removed from the opposite tibia and cut with the Albee angle saw. Four holes were drilled in each side of gutter and the graft was tied in place with No. 2 chromic gut; the skin was closed with black silk. The leg was put in a plaster cast.

The cast was removed at the end of eight weeks. In the meanwhile the patient was allowed to get about in a wheel chair and

with the aid of crutches. An X-ray picture was taken when the cast was removed and showed good position, except slight forward bowing and good bony union. The skin wound was healed except at one point there appeared to be a small collection of pus. This was incised and appeared to be superficial. However, this point continued to drain slightly until April 4, 1921, when the graft was removed and the drainage promptly stopped. The graft was found lying free in the gutter where it had been placed, was not attached, and in appearance was about the same as on the day it was freshly cut. The gutter, however, had partially filled in and there was firm bony union between the fragments.

The atrophied muscles gradually developed with the aid of massage and exercise, and the patient left the hospital June 14, 1921, with a strong, useful leg, which did not show any shortening and very little deformity.

This was an instance where union took place in the presence of slight infection. This case also shows that the heavy graft stimulated the bone regeneration and acted as an internal splint, but played no other part in producing union.

Case IV—K., S. Age 24 years. Supernumerary. Diagnosis, adenomatous goitre.

This patient was admitted to the hospital April 1, 1921. He stated that the swelling in his neck appeared suddenly after coaling ship, and that he was surveyed from the Navy in 1918 for goiter. The swelling caused pain which radiated to the right shoulder and arm. He also complained of dyspnea upon exertion. Temperature was normal; pulse ranged between 86 and 90. There were no tremors. Heart and lungs were normal. The right lobe of the thyroid, enlarged to about the size of a tangerine, was freely movable and not adherent.

This was clearly a surgical condition, unsuited for X-ray treatment, and not requiring preliminary ligation. Some of these adenomas become cystic and toxic. This one showed no signs of toxemia, except slight tachycardia. The symptoms were due to pressure. The removal of an adenomatous goiter, by lobectomy or enucleation, is a safe operation, carrying with it a mortality of less than 1 per cent in the hands of qualified operators.

Operation. Ether. Started 10.38 a. m. Operation finished 11.20 a. m.

Collar incision. Muscles retracted. Right lobe of thyroid delivered. Vessels clamped and tied. Capsule of gland incised and a large cystic adenoma involving the entire right lobe enucleated.

April 23. Wound healed and patient discharged from hospital. No symptoms.

Pathological report: "The gland weighs 62 grams. It is irregularly nodular, soft, and gives the fluctuating sense of containing uid. The cut surface shows many hemorrhagic areas, small cysts ontaining gelatinous material and areas of dense colloid.

There seems to be no increase in vascularity. Fibrous tissue is rominent and the epithelium shows no active proliferation."

CHRONIC CHOLECYSTITIS.

By C. S. Norburn, Lieutenant, Medical Corps, United States Navy.

From a review of the last Surgeon General's report it would seem iat the frequency of the condition of chronic cholecystitis in the aval personnel and the gratifying results following surgical treatient are not fully appreciated. The symptoms of this condition re quite distinct from the well-known colic in cholelithiasis—they re the symptoms of chronic indigestion due to a low-grade infection f the gall bladder.

In most of the cases coming under our observation the condition ad begun insidiously and had continued practically without respite or from one to two or more years. There was a history of chronic ndigestion; discomfort or actual pain coming on within 30 minutes fter the taking of food. There was pain that was especially severe fter the ingestion of some particular kind of food, such as greasy oods or certain fruits, thus differing from the pain of ulcer, which ll foods tend to relieve and which returns after a much longer time. he indigestion was associated with the belching of a large quanty of gas and in its more severe forms vomiting immediately after ach meal. The patient was usually constipated, complained of dziness and headache, and often was entirely incapacitated. In two f the cases the symptoms seemed intermingled with those of chronic ppendicitis, but in only one was any pathology found in the appendix. A history of jaundice was obtained in only one case; here ie condition was associated with cholelithiasis. Physical examinaon of patients with this condition may be negative or there may e slight tenderness on deep pressure over the gall bladder.

In its gross appearance the gall bladder loses its normal color and ecomes yellowish white; the liver opposite its fossa usually shows ie white streaks of localized hepatitis. The lymph glands along the ystic duct are enlarged and the gall bladder may have a very much ickened wall, may be attached to the surrounding structures by dhesions, always contains dark bile, sometimes very thick, and may r may not contain stones.

Cholecystectomy is the operation of choice. In the operating rooms at the Mayo clinic it has been stated that a patient who has had a gall bladder drained is worse at the end of three months than he was at the time of operation. In chronic cholecystitis with or without stones the gall bladder should be removed for the following reasons: (1) The infection is in its walls and drainage leaves infected tissue behind. (2) Neoplasms of the gall bladder frequently start close to the neck and their presence can not be determined through the small opening made for drainage. (3) After being drained the fundus is attached by adhesions to the abdominal wall at a lower level than the cystic duct outlet. The gall bladder normally empties itself by a contraction of the fundus. This movement now being interfered with by the adhesions, there is a greater tendency for the stagnation of bile when drainage is discontinued than there was before the operation. (4) Drainage of the gall bladder requires more time and is perhaps not as safe as its removal. (5) The period of convalescence is much shorter and there is not so much danger of a postoperative hernia or a persistent fistula after cholecystectomy as there is after cholecystostomy. Again, there seems no good reason why its removal should result in harm. Holding, as it does, only a little more than an ounce, it can serve very little purpose as a storehouse for the 16 to 28 ounces of bile secreted in a day. The function of gradual contraction during digestion thus causing a constant flow rather than spurts of bile, which is often assigned to it, must be of slight importance, judging from the lack of any symptoms following its removal. In most cases of chronic cholecystitis the gall bladder with its thickened fibrous walls containing tarry bile, its duct perhaps plugged by a stone, has entirely lost its function and the body has more than likely long since compensated for its loss.

The technique of operation in our cases is that which has been standardized at the Mayo clinic. The incision is a very high one, starting about the tip of the ensiform cartilage near the midline and running downward nearly to the umbilicus, cutting the muscle fibers obliquely, so that the lower end of the incision is about one-half inch to the right of the upper end. It is important that the incision be high and near the mid line so as to allow the left lobe of the liver to be rotated through it. The falciform ligament is next divided between clamps. Following Masson's advice a gauze pack is now placed between the upper surface of the right lobe and the diaphragm to act as a fulcrum, and the gall bladder seized and strongly drawn upon thus rotating the edge of the liver out of the abdomen and putting the cystic duct on a stretch. The mass of tissue containing the cystic duct and artery is separated from the liver at a point just below the neck of the gall bladder by blunt dis-

ection with a Kelley hemostat, divided between two clamps and the tump doubly ligated with heavy chromic, no attempt being made o approach very close to the union with the common duct. The gall ladder is dissected upward, but left partly attached to the border of he liver to serve as a tractor while the fossa is stitched together nd omentum is drawn over the suture line. The removal of the all bladder is now completed. Masson's pack taken out and the bdomen closed without drainage except in case of soiling or excesive oozing when we have been draining with half of an old rubber love placed along the suture line. This is partly removed the secnd day and taken out the fourth.

The following is a report of seven cases of chronic cholecystitis oprated upon recently at the United States Naval Hospital, League sland, Pa.:

Case I.—A., J. Private, United States Marine Corps. Age 24 ears. Admitted September 21, 1920. Discharged December 1, 920. Diagnosis on admission, undetermined.

Complained of constant pain in epigastrium; more severe immeiately after eating. He states the trouble began five years ago and as been getting progressively worse. Greasy foods and beans cause he most trouble. There is frequent nausea and occasionally vomitng and constant belching of gas. He is very constipated and suffers great deal from headache. Father and brother were sick for years ith indigestion and died from "stomach trouble." Mother died of uberculosis.

Physical examination.—Well developed. Weight, 148 pounds. Iaximum has been 170. Teeth in poor shape. Slightly tender area inches below costal margin to left of mid line, pain radiating to ight iliac region. Otherwise negative except that he gave the apearance of being sick. Temperature, respiration, and pulse normal. Jrine and Wasserman, negative. Total acidity, 74; free HCl, 42. Combined 25. Acid salts, 7. Fluoroscopic and X-ray examination f stomach, duodenum, and colon, negative.

At operation stomach, duodenum, appendix, spleen, and kidneys ere found normal. Gall bladder a dirty yellow in color. Liver howed evidence of hepatitis. One small spot in the edge of liver ontained a drop of pus. Gland on cystic duct was enlarged. Gall ladder was removed. Rubber tissue drain. Patient made an unventful recovery; improvement was apparent immediately after peration, and after five days he was able to eat any food without iscomfort; rapidly gained in weight and was discharged with no ymptoms.

Case II.—S., S. Supernumerary. Age, 21 years. Admitted November 15, 1920. Discharged December 14, 1920. Diagnosis on dmission, appendicitis, chronic.

Complained of "gas on stomach." Was well until August, 1919, when he noticed that about one-half hour after eating he would have quite a lot of gas formed in his stomach, which would cause pain in the left side of chest. After belching for about one-half hour he would get relief. This trouble was worse after eating greasy foods; not affected by other kinds of food. He was very constipated. Appetite poor. Has lost 22 pounds in weight since May, 1920. Father died of "liver trouble."

Physical examination was negative save for slight tenderness over appendix. Temperature, pulse, and respiration normal. Urine negative. Leucocytes, 8,600. Feces negative for ova or parasites. Wassermann negative and sputum negative for T. B. Gastric analysis: Total acidity, 78 per cent; free, 51; combined, 13; acid salts and organic acids, 14 per cent. Fluoroscopic and X-ray examination negative for gastric and duodenal ulcer.

At operation omentum was found adherent to the gall bladder. Three glands were enlarged on the bile ducts. Gall bladder showed evidence of chronic inflammation and there was marked hepatitis on the liver opposite its fossa. Stomach, duodenum, and appendix normal. Gall bladder was removed. Its walls were thickened and it contained dark, thick bile. The patient made an uneventful recovery, and there were no symptoms after the fifth day. Discharged well.

Case III.—D. F. T. C. W. T. Age, 40 years. Admitted November 8, 1920. Discharged December 28, 1920.

Patient was in this hospital April 17, 1920, with diagnosis of gastritis, acute. He stated that since January, this year, he has had pain in stomach about one-half hour after meals. Severe dizziness then comes on, and he has a large amount of gas on stomach. Vomits frequently. Trouble is worse after eating meat, fruits, and milk. Urine was negative. Leucocytes, 8,990. R. B. C., 4,720,500. Feces negative for occult blood. Gastric analysis: Total, 38; free, 8; combined, 30. Wassermann negative. Physical examination, including examination of eyes, negative. Discharged somewhat improved.

Admitted again June 18, 1920, with the same diagnosis. Marked headache and dizziness. Pain after eating, most marked on left side of epigastrium. Has been vomiting after each meal. Appetite very poor. Constipated. Has lost 35 pounds in weight. Patient was very nervous.

X-ray and fluoroscopic examination of alimentary tract negative. Patient was dieted and returned to duty not much improved.

Returned November 8, 1920. Symptoms had become aggravated and dizziness and weakness much worse. Diagnosis of chronic cholecystitis was made and operation performed November 24, 1920.

The gall bladder was small and thickened. The gland along its duct was enlarged and the liver showed evidence of hepatitis opposite its fossa. Stomach, duodenum, and appendix normal. The gall bladder was removed and the abdomen closed without drainage.

Recovery without complications. All symptoms disappeared after the first few days. Discharged to duty well.

Case IV.—H., W. Ensign. Age 38 years. Admitted August 5, 1920, with an acute surgical abdomen.

Though it was impossible to obtain a complete history he stated that for several years he had suffered with indigestion associated with the belching of a large amount of gas.

He was operated upon immediately, the cause for his acute symptoms was found to be a perforated duodenal ulcer, which was repaired, and a posterior gastro-enterostomy performed. The gall bladder was found to be filled with stones, one of which plugged the cystic duct. Owing to the critical condition of the patient, no attempt was made to deal with it. After recovering from operation much of his old symptoms had improved. However, he continued to have some pain immediately after eating, especially after taking greasy foods and continued to belch a large amount of gas.

Cholecystectomy November 24, 1920. Gall bladder containing approximately 1,000 stones was removed. Gall bladder and liver opposite it showed chronic inflammation.

Patient made a rapid recovery and went on sick leave December 15, 1920. No symptoms. On March 9, 1921, he returned from leave and was discharged to duty well.

Case V.—B., E. Supernumerary. Age 27 years. Admitted November 3, 1920. Discharged November 28, 1920.

First attack of indigestion in 1918. A vomiting attack which lasted several days. No pain. Was well until last summer when pain started in right lower quadrant and he vomited several times. Attack lasted seven weeks. The last attack came on two months ago with cramp-like pains high up on right side. Has had dull pain in right lower quadrant ever since. Feels full after taking small amounts of food and if he tries to eat greasy or heavy foods he vomits immediately after taking them. There is slight tenderness at tip of ninth rib, none over McBurney's point. Urine, temperature, pulse, and respiration normal.

Cholecystectomy November 24, 1920. Stomach, duodenum, and appendix normal in appearance. Gall bladder shrunken, inflamed; two enlarged glands on its duct. Marked chronic hepatitis opposite its attachment. Removed and closure made without drainage. Made good recovery and was discharged well.

Case VI.—S., C. J. Chief yeoman, United States Navy. Age 27 years. Admitted December 21, 1920. Discharged March 21, 1921.

Symptoms started four months ago with sharp pain in the right lower quadrant; was nauseated. Has had three attacks within the last month. No belching of gas, constipation, or trouble after meals. Had appendicitis at 14 years of age. No operation. Temperature, pulse, and respiration normal. Urine normal.

Operation January 4, 1921. The appendix was entirely obliterated, only a fibrinous band remaining. This was removed. There was a large amount of adhesions around the caecum. The stomach and duodenum were found to be normal. The gall bladder was chronically inflamed, and marked hepatitis was present opposite its fossa. The gland on its duct was enlarged. Cholecystectomy was performed and the abdomen closed without drainage. The patient made an uneventful recovery and was discharged to duty well.

Case VII.—K. J. Supernumerary. Age, 33 years. Admitted December 2, 1920. Discharged January 23, 1921.

Complained of chronic indigestion and sharp pains in epigastrium coming on 5 or 10 minutes after meals. It is associated with vomiting and the belching of a large amount of gas. Fried foods cause more trouble than any other type. He was constipated and often felt dizzy. This indigestion came on about two years ago. He states that he stayed in the Army hospital at Camp Travis, Tex., for one year—his appendix was removed there—and in the hospital at Fort Sheridan, Ill., for several months where he was treated for suspected ulcer. He states that treatment consisted chiefly of milk diet. Discharged from Army for physical disability April 20, 1920. Condition has progressively grown worse and he is now totally incapacitated.

Physical examination, poorly nourished. Slight tenderness in epigastrium. Generalized glandular enlargement. Urine and Wassermann, negative. Sputum negative for tuberculosis. Gastric analysis: Total acidity, 52; free Hcl., 24; combined, 12. Acid salts, 6. Fluoroscopic and X-ray examination negative for ulcer. Temperature, pulse, and respiration normal.

Operation January 6, 1921. Stomach and duodenum normal. Appendix absent. Gall bladder yellowish white. Liver shows the white streaks of chronic hepatitis opposite the side of the gall bladder. Glands on the bile duct enlarged. Gall bladder was removed and closure made without drainage.

The patient had good post-operative recovery. About five days he was able to eat any food without discomfort or vomiting. He was discharged well.

IMPRESSIONS FROM ONE HUNDRED MASTOID OPERATIONS.

By J. W. Green, Lieutenant, Medical Corps, United States Navy.

Mastoiditis is a much more common complication of otitis media and the acute infectious fevers than is usually believed. In rare cases it occurs without primary infection of the middle ear. The recent use of the X ray in diagnosis of this condition proves its existence to some extent in all cases of otitis media. At times only a plastic exudate occurs in the mastoid cells. This exudate is many times absorbed with complete recovery. At times these cells are filled with straw-colored fluid under pressure. Mastoiditis occurs as a complication most frequently with measles and influenza. It is also commonly found with scarlet fever, diphtheria, pneumonia, rhinitis acute, chronic sinus disease, syphilis, and mumps, in about the order named.

Contrary to textbook descriptions, the findings of ear discharges, bulging of the drum membrane, pouching of the posterior superior external canal wall, and tenderness over the mastoid with edema of the superficial tissues may separately and collectively not be present. Perisinus disease, septicemia, and pus in the mastoid cells may not be characterized by pain. Two cases I have recently seen, where hemolytic streptococci were found in pure culture in the mastoid pus, showed no pain and no fever. The X ray is invaluable in diagnosis as well as in deciding when to operate. The increase in the percentage of polymorphonuclear leukocytes, coupled with positive X-ray findings, in a case of otitis media acute which fails to subside within two weeks is an indication for early operation in the absence of nocturnal pain and other classical symptoms and physical findings.

Many cases of influenza and measles show absorption of bone weeks and months after otitis media has entirely subsided. The patients complain of indefinite discomfort about the ear with loss of weight, bronchitis, and general malaise. The cells will be found to contain pus or pus with granulations. The blood shows a definite secondary anemia.

Early operation usually prevents the picture of chronic fetid aural discharge, loss of drum membrane and ossicles with middle ear or internal ear deafness, also the complications of acute mastoiditis, such as perisinus abscess, sinus thrombosis, septicemia, brain abscess, extradural abscess, and lung abscess.

When everything has been considered, the surgeon's first impression as to the necessity for operation is usually correct. Procrastination has no place in the surgical treatment of mastoiditis.

In the presence of heart or lung complications it is safe and feasible to operate with local anesthesia in combination with an ounce or two of whisky and morphine in one-fourth grain dose.

There is no more shock than under ether or other general anesthesia. The postoperative temperature rarely rises over 1 degree. Operation consumes no more time under local than under general anesthesia. Double mastoids are as safely done under local as under general anesthesia and are without pain to the patient. Procain or novocain in 1 per cent solution, with adrenalin, are acceptable as local anesthetics.

The operative technic of choice in all cases of acute mastoiditis, uncomplicated by perisinus disease, sinus thrombosis, and brain lesions is as follows: Thoroughly curette all mastoid cells and open wide the mastoid antrum; then douche with peroxide of hydrogen or 3½ per cent tincture of iodine; remove all fragments of bone and soft tissue; incise the membrana tympani freely; insert a cigarette drain into the mastoid antrum by the shortest route from the incision to the antrum; allow the blood to fill the wound; close the periosteum with two or three interrupted catgut sutures and the skin with Michel clips; apply a dry dressing of fluffed gauze. The blood clot thus formed in the mastoid wound and middle ear usually sterilizes the diseased mastoid and middle ear, even in the presence of hemolytic streptococci. The drains may be removed on the fourth day and the clips on the seventh.

Usually, or in about 66 per cent of the cases which have been carefully and thoroughly operated on, the wound heals by primary intention, leaving a linear scar without depression. The patient is saved the suffering of weeks of painful dressings required by the antiquated method of packing the mastoid with gauze daily, as has been the vogue for sereval years. If the wound should not be sterilized by the blood clot, nothing is lost and the wound will heal more quickly than with the packing operation and with a much less unsightly scar. The hearing usually returns to normal within 2 to 4 weeks. The patient is able to resume his usual labors in 2 weeks instead of 6 to 12 weeks. Much time and suffering, as well as expense, are saved in dressings.

In order to succeed in the blod-clot operation, one must be sure that he has reached all infected cells and thoroughly cleaned them out and that his asepsis is perfect. Naturally, it is advantageous to operate early, before perisinus disease, sinus thrombosis, or other complications have developed.

The blood-clot operation is not a new operation, but one which has been brought out of the ash can of disuse and slightly modified.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander C. W. O. Bunker, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.
Lieutenant Commander John Harper, Medical Corps, United States Navy.
Lieutenant Commander L. H. Clerf, Medical Corps, United States Navy.
Lieutenant W. L. Martin, Medical Corps, United States Navy.
Lieutenant Edwin Peterson, Medical Corps, United States Navy.

GENERAL MEDICINE.

Ashby, W. **Study of transfused blood, the periodicity in eliminative activity shown by the organism. Study of transfused blood, blood destruction in pernicious anemia.** Jour. Exper. Med. August, 1921.

In 1919, while working on the determination of the length of life of the transfused blood corpuscles in man, Ashby reported that it was possible in mixtures of corpuscles of different groups to separate the corpuscles practically quantitatively by treating with a serum that agglutinates the corpuscles of one kind, leaving the others unagglutinated. In other words, after a recipient has been transfused with blood of a group other than his own, specimens of his blood treated with a serum that will agglutinate his own corpuscles, but not the transfused corpuscles, show unagglutinated corpuscles in large numbers. These unagglutinated corpuscles which appear in the recipient's blood after such transfusion are the transfused corpuscles, and their count is a quantitative indicator of the amount of transfused blood still in the recipient's circulation.

In this work the life of the transfused corpuscle was found to extend for 30 days or more. Prior to this, several workers gave the probable life of the blood corpuscle periods ranging from 10 to 26 days. The beneficial results of transfusion were considered due to the functioning of the transfused blood corpuscles, and not primarily to a stimulating effect on the bone marrow.

In regard to the periodicity in eliminative activity shown by the organism, it was considered that group 4 transfused blood in a recipient of unlike group is eliminated by a blood-destroying activity of the body, which activity is periodic both in men and women, and in women coincident with menstruation, the elimination of transfused blood probably taking place as a part of a period

of blood-destroying and blood-producing activity of the body, although direct evidence to this effect is so far lacking.

In connection with blood destruction in pernicious anemia evidence was presented to show that there is no hemolytic toxin producing the anemia in pernicious anemia. Partial evidence was presented to show that the periods of active blood destruction which are seen as the exception in pernicious anemia cases during a series of transfusions are due to the activity of the blood-destroying organs of the body rather than to the intrinsic weakness of the pernicious anemia blood corpuscle. It was considered questionable that blood destruction is as important a factor in producing the anemia of pernicious anemia as it is at present usually assumed to be. (J. H.)

HAMILL, P. **The oral administration of pituitary extract.** Proc. Roy. Soc. Med., London. June, 1921.

Clinical evidence has amply demonstrated that thyroid extract administered by the mouth is absorbed and produces definite effects. In the case of other glands having an internal secretion the results are less definite. It therefore seemed desirable to the author to make some critical observations on the subject. Pituitary extract was selected for study, as its action after injection has been fully studied and is readily recognizable.

The following is a summary of the results obtained:

Animal experiments prove that pituitary extract administered by the mouth causes the characteristic uterine contractions.

Absorption takes place from the stomach and is more rapid when the stomach is full and actively digesting.

Large doses produce colicky contractions of the intestine and vomiting.

Clinical evidence harmonizes closely with animal experiment.

In view of the rapid absorption from the stomach and the fact that the intestinal juices rapidly destroy the active principle it appears preferable that pituitary extract should be administered in solution and after meals. (W. M. K.)

BARKER, L. F. **The causes and treatment of the conditions underlying high blood pressure.** Ohio State Med. Jour. October, 1920.

The author reviews his personal experience, clinical and pathological, with high blood pressure and its bases, and formulates his present impressions of causes and treatment based upon his experience and a study of the bibliography; but he limits his remarks to the subject of the clinical types of chronic arterial hypertension, their causation, and the management of patients presenting them, and does not attempt to discuss acute or transitory hypertension.

For convenience of description he divides the clinical cases of hronic arterial hypertension into four groups which he regards as orresponding to four successive periods in the course of a patho-ogical process that is common to all the cases, though susceptible o remarkable variations as regards rapidity of progress and associ-ted conditions.

I. Incipient arterial hypertension often accidentally discovered.—n routine physical examinations of patients applying for a general hysical survey it is common to find a maximal blood pressure be-ween 140 and 160 millimeters, with or without a faint trace of lbumin in the urine or a few casts in a centrifugalized specimen. 'hese persons with slight arterial hypertension may not be conscious f any unpleasant symptoms. In fact, they often look and feel nusually well. The blood pressure in such instances is often vari-ble, around the upper limits of normal. It is in this stage of hyper-ension that preventive and arrestive measures can be instituted with he greatest prospect of success.

II. Relatively early chronic arterial hypertension without other bvious signs of renal or arterial disease.—In this group of cases here is outspoken arterial hypertension, the maximal pressure vary-ng between 160 and 190, the minimal pressure between 70 and 100 illimeters. The apex beat of the heart is forcible, the aortic second ound is accentuated, the left ventricle is a little enlarged, and the lectrocardiogram reveals "left ventricular preponderance." There ay be no sign of arteriosclerosis in the palpable arteries, and renal unction, as revealed by studies of the urine and by the ordinary ests of renal function, may show little or no impairment. The arte-ial hypertension in this group of cases may be discovered acci-entally on routine examination. Some of these patients, however, ay have begun to suffer inconvenience from the increase in the lood pressure. Many of them complain of headache, or of a sense f fullness or pressure in the head, of transient dizziness, of lack of ndurance, of irritability and of sleeplessness—especially toward orning.

III. More advanced stage of chronic arterial hypertension, but be-ore the appearance of serious complications.—In this group of cases he maximal blood pressure may be 200 millimeters or more and the inimum 100 millimeters or more. There is demonstrable hyper-rophy of the left ventricle with a ringing aortic second sound. The atients may have polyuria, both diurnal and nocturnal. The urine s usually of low specific gravity, and contains from time to time a race of albumin and a few hyaline or granular casts. The specific ravity tends to become fixed (hypostenuria) and there may be a light increase in the nonprotein nitrogen of the blood. The phtha-ein test of renal function may show a normal output or even hyper-

permeability, though in certain of the cases the output may be moderately reduced. The peripheral arteries may or may not be palpably thickened.

The patients in this group may or may not complain of troublesome symptoms. Very often the group of symptoms mentioned as occurring sometimes in Group II are present in these patients, and the majority of them, too, begin to feel the strain upon the heart muscle, complaining of a little dyspnoea on exertion.

IV. Late stages of chronic arterial hypertension with serious complications (*cerebral, cardiac, renal, etc.*)—The patients of Groups II and III are prone sooner or later to enter this fourth group, in which any one of several possible complications appear. Thus, due to a cerebral arteriosclerosis, there may be a sudden cerebral hemorrhage with apoplectic stroke; or, due to a retinal arteriosclerosis, there may be a retinal hemorrhage with amblyopia or scotomata; or, due to an associated coronary sclerosis with insufficient nutrition of the heart muscle, there may be attacks of angina pectoris, of cardiac asthma, or of pulmonary edema; or, due to the combination of impaired nutrition of the heart in maintaining the chronic arterial hypertension, myocardial insufficiency may set in with all the signs of cardiac decompensation (dilatation of the heart, chronic passive congestion, dyspnoea, enlargement of the liver, oliguria, pronounced albuminuria, edema of the lower extremities and general anasarca); or, due to associated lesions in the kidneys, renal decompensation may set in, especially in the course of an acute insufficiency, and the patient may become uremic, exhibiting the nervous symptoms (convulsions, temporary paralysis, disturbances of vision, headache, delirium, or coma), the digestive symptoms (anorexia, nausea, vomiting, hiccoughs, diarrhea), the cutaneous symptoms (pruritus), or the blood findings (increased nonprotein nitrogen, increased urea nitrogen, etc.), well known as concomitants of a uremic state.

It is not certainly known what all the causes of high blood pressure are. We do know a whole series of anatomical changes and of pathological deviations from normal function that are met with in long-continued chronic arterial hypertension. We can say fairly positively that the principal factor concerned in the actual production of chronic arterial hypertension lies in a diminution of the lumina of the small terminal vessels (arterioles) of the arterial system at its junction with the capillaries; that in the early stages of the process this diminution in the caliber of the small arterioles is due mainly, if not entirely, to a functional state in which a persistent hypertonus of the smooth muscle of the walls of these arterioles exists; that in the later stage of the process this functional hypertonus is associated with an organic narrowing (sclerosis) of these minute arterioles.

In recent years new methods of study of pathological processes have thrown new light on the question of hypertension, and with the growth of our knowledge of etiology and pathogenesis have come new hopes for therapy.

There has been much difference of opinion regarding the cause of high blood pressure in chronic renal disease, especially in the so-called "primary contraction of the kidneys," in which the highest systolic and diastolic blood pressures are met. These high blood pressures are not due to the sclerosis of the renal arterioles alone, but rather to a narrowing of the lumina of the arterioles all over the body, to a general arteriolar constriction, partly of vasotonic origin, partly of sclerotic origin. The cause of the contracture of the musculature of the arterioles and of the sclerotic changes, the author believes, will be found perhaps in some normal vaso-constrictor substance present in excess, possibly in some other chemical substance not normally present in the body, or perchance in some abnormal sensitization of the vasomotor system to reflex or to chemical stimuli.

High blood pressure is often present in patients who show also arteriosclerosis of the palpable arteries, but there is no constant relation between the degree of palpable thickening of the vessels and the height of either the maximal or minimal blood pressure; some patients may show extreme thickening and even calcification of the palpable arteries without increase of blood pressure, others may long exhibit a maximal systolic blood pressure of over 200 millimeters Hg. without any thickening of the arteries accessible to palpation. Sclerosis of the arterial system other than that involving the minute arterioles throughout the body has but little, if anything, to do with the production of high blood pressure. And there is some reason to believe also that even the sclerosis of the small organ arterioles may be secondary to high blood pressure, or what causes it, rather than that the initial increase in blood pressure is due to an arteriolar sclerosis. Once a high blood pressure has been maintained for a time and arteriolar sclerosis has begun, a vicious circle may be formed, the arterial hypertension favoring the progress of arteriolar sclerosis, and in turn the arteriolar sclerosis helping to maintain or to increase the arterial hypertension.

It is known that high blood pressure, arteriosclerosis, and "chronic Bright's disease" are common among persons who have been exposed for long periods to physical or mental overstrain. Why such wear and tear should in some men and not in others be followed by high blood pressure and associated conditions is not certainly known. Definite evidence that infections can be responsible for starting a chronic hypertensive process is still lacking, and the same may be said of the intoxications.

Attention has of late been directed to the possible relationship of metabolic and of endocrine disorders to chronic arterial hypertension. It has long been known that patients with obesity, with diabetes mellitus, and with gout tend to develop an arteriosclerotic process, and also that many of them have high blood pressure. Some of the hypertensives have an increased rate of basal metabolism, some a decreased rate, and many a normal rate. Endocrine disorders are common enough among hypertensives, but what the relations of these disorders of the thyroid, hypophysis, suprarenals, and gonads to hypertension are, if there be any, remains yet to be determined. The author's impression is that hyperthyroidism and gonadal (climacteric) disturbances may in some instances of chronic arterial hypertension be important accessory etiological factors.

The well-known fact that certain families may contain several members who develop arterial hypertension and die of apoplexy, angina pectoris, myocardial insufficiency, or uremia at a relatively early age lends color to the view that hereditary and constitutional factors are of great importance in the etiology of the hypertensive states. These families produce members having a constitutional inferiority—a circulatory system, a nervous system, a metabolic and endocrine system of peculiar stamp.

In speaking of the management of patients with high blood pressure, the author tells us that in all stages of the hypertensive process, psychotherapy in the broad sense of dispelling fear, of inspiring confidence and hope, of educating the patient regarding the nature and cause of his malady, of guiding him toward a more hygienic mode of life, and of cultivating in him the ability to face the realities with serenity, will be found to be the most beneficently potent and serviceable agent we possess.

In planning dietary instructions for the patient with high blood pressure one should know "(1) His habits of eating, (2) his occupation and mode of life, (3) his calculated ideal weight and the extent to which his actual weight deviates from this, (4) the circumstances of his life in as far as they bear upon the accessibility of articles of diet and upon their mode of preparation, and (5) the functional capacity of his digestive, his circulatory, and his eliminative organs. And then, if the physician will use ordinary common sense in addition to his special medical knowledge he will be able to plan a diet that will be compatible with the patient's whole condition, agreeable and satisfying to him, and not impracticable as regards his place of residence, his ménage, or his purse."

"The following principles may be of help as a guide in the planning of a dietary régime: (1) The patient's preferences regarding food should be given every consideration compatible with innocuity (2) the diet should contain a sufficient number of calories to maintain

the patient at calculated ideal weight, and this will depend to some extent upon his occupation and muscular activity; (3) if the patient be obese, the diet should be such as gradually to reduce his weight, and if he be emaciated, it should be liberal enough gradually to increase his weight, though it should be borne in mind that, other things being equal, patients with tendency to high blood pressure seem to do better, as a rule, when a little under calculated ideal weight than when they are above it; (4) the diet should be simple, agreeable, and easily accessible to the patient, and it should be eaten at regular hours, in a leisurely way, and in pleasant surroundings; (5) it should be a well-balanced diet, containing the proper proportions of proteins, carbohydrates, fats, vitamines, mineral salts, and water; excess of proteins, of purins and extractives, of carbohydrates, and of sodium chloride should be guarded against, and a plentiful supply of vitamines should be insured by the inclusion in the daily diet of a certain amount of milk (and dairy products), leafy vegetables, and fruit or fruit juices; and (6) the diet should be compatible with the patient's powers of mastication and digestion, with the efficiency of his myocardium, and with his capacity to eliminate the end products of metabolism, though it is only in the later stages of the malady that the cardiac and renal functions are unequal to a diet suited to a normal person of the same age and occupation."

In the earlier stages of hypertension it is not work, either mental or physical, that is harmful to the patient, but the conditions under which the work is done, and the worry, haste, agitation, and excitement that may accompany it. Even in the later stages of the malady some properly regulated work is desirable, for every physician knows the great harm that is likely to result from the entire relinquishment of work.

Many elderly hypertensives do, however, work too many hours. They carry too heavy a load, scorning rest and outdoor exercise, vacations, relaxations, and recreations, failing to recognize that they can do more work in less time provided the time they do not work is given over to proper recreation.

In the early stages of arterial hypertension the patient's bathing habits may without harm be the same as those of an entirely healthy person, but when the hypertension has become outspoken, and especially in the later stages, when serious complications threaten, only warm or tepid baths should be permitted. A warm bath, though it increases the systolic pressure but slightly, is often followed by a drop of 25 to 30 millimeters in diastolic pressure, with corresponding increase in the "heart load."

Drugs have their place in the treatment of chronic arterial hypertension, but it is a less important place than was formerly supposed.

Constipation should be overcome mainly by diet and exercise, but mineral oil and gentle laxatives at night or morning salines may be

required. Many hypertensives feel better for a weekly purge—blue mass and compound extract of colocynth at night, followed by a saline the next morning.

The administration of iodides has gone out of fashion, but some patients with hypertension feel better when they take them. This may be due to a decrease in the viscosity of the blood.

The nitrites, too, are used much less than formerly in hypertension. Nitroglycerin and sodium nitrite will reduce blood pressure temporarily but without advantage to the patient except in cases of angina pectoris or in those in which cerebral apoplexy is threatened.

Digitalis is of great value when the heart muscle has begun to flag. The circulation improves, renal elimination is favored, and the blood pressure, both maximal and minimal, may sometimes show a lower range. In a case in which the blood pressure has fallen from enfeeblement of the myocardium, with or without "mitralization" of the heart, digitalis may restore the blood pressure to its previous high level with both subjective and objective improvement of the patient.

In the early stages of hypertension it is desirable to remove all definite foci of infection that are discoverable in patients in the hope that, by cutting off chronic bacterial intoxication, something may be done toward arresting the underlying process.

In the later stages of the disease care should be taken not to subject the patient to unnecessary surgical risk.

The bloodletting of our ancestors has its place in the treatment of patients with high blood pressure; most of the advanced cases, especially the plethoric and the obese, are better for the abstraction by needle of half a liter of venous blood at intervals. (W. M. K.)

Biffis, P. Symptoms derived from the digestive tract in progressive pernicious anemia. Policlinico, Rome, June 27, 1921.

While not characteristic and distinctive of the disease, glossitis, stomatitis, diarrhea, and achylia gastrica are important symptoms that merit consideration. The author's paper is based on a careful personal study of 30 cases at the medical clinic of the Royal Institute of Special Pathology, Turin.

As to origin, these cases were thus divided: In 7 cases pregnancy and the puerperium played a part; of the remaining 23, all men, 2 were infected with bothriocephalus latus, 2 had malaria, 1 had syphilis, and no cause could be determined in 18. In all, the blood picture was typical.

In all but one of the cases studied the digestive disturbances were coeval with other manifestations or antedated them only by a fort-

night. In that one there had been an antecedent diarrhea for some years. In two cases stomatitis was present at a late stage. Glossitis was never noted. Lack of appetite and positive aversion to food marked only the worst phases of the disease.

For the most part subjective digestive disturbances were slight. Vomiting was commoner among women than men.

Achylia gastrica occurred in 29 cases. About half the cases had abnormal gastric motility, Ewald's test breakfast being passed out of the stomach in 30 to 45 minutes. Indicanuria and urobilinuria were frequent but not constant. As a rule bowel function was normal. Sometimes there was alternating constipation and diarrhea.

The author reports that in his Turin clinic there were but two cases of stomatitis in a period of 10 years, and these were due to the hemorrhagic diathesis and occurred at an advanced period.

Disturbance of the tongue is in no sense a forerunner of pernicious anemia, though it may lead to examination of the blood before anything else suggests anemia. It is the result of anemia, and so the tongue is clean, mobile, and scantily provided with papillae even at the base.

More important than the mouth symptoms are those related to gastric function. As stated above, achylia gastrica was present in 29 of the cases and in all of them digestion was satisfactorily accomplished. The thirtieth case was that due to bothriocephalus latus. Studies by various authors have established the fact that in bothriocephalus-anemia gastric secretion is normal in one-third of the cases. Statistics are not satisfactory in cases associated with pregnancy and are very contradictory in those whose origin is undiscoverable; but achylia gastrica is usually present at least late in the disease. On the other hand, it is noteworthy that achylia gastrica may exist for years without causing anemia (latent pernicious). It would seem, however, that achylia gastrica and pernicious anemia do tend to coexist as though disorder of the hematopoietic system and of stomach function arose from a common cause.

Hypermotility of the stomach was fairly common in spite of the fact that it is usually associated with hyperacidity. It may be accompanied by spasm and closure of the pylorus. Pain may then occur, transient in character, and a tumor develop which disappears more slowly—in two or three days.

The writer is inclined to ascribe the rapid emptying of the stomach common in pernicious anemia, to insufficiency of the pylorus rather than to spasm, though this does occur in some cases.

As frequently recurring spasm of the pylorus through a considerable period of time may lead to hypertrophy simulating organic stenosis and exciting suspicion of cancer, the blood examination is of maximum importance.

Intestinal disorders occurred in the cases under consideration but were neither serious nor intense enough to dominate the picture or affect the issue. A diarrhea of more than two weeks duration was unusual. While it is a mistake to ascribe the diarrhea to achylia gastrica, nevertheless administration of HCl by mouth is an effective remedy. Recently, Gross has tried to prove that the diarrhea is caused by absence or reduction of the external secretion of the pancreas.

Conclusions: Buccal changes are rare, at least in Italy. They are the result, not the cause, of pernicious anemia. Achylia gastrica may be absent. This is rare. It is not the cause but the result of the disease. Rapid passage of food from the stomach is a frequent feature. It is due not to hypermotility of the stomach but the pyloric insufficiency. The pyloric spasm, a rare manifestation, has a vagotonic origin. The cause of the diarrhea is obscure. Oral administration of HCl is the best treatment. (J. S. T.)

Romanelli, E. **Differential diagnosis between varicella and variola.** Policlinico, Rome, July 18, 1921.

During the epidemics of 1918, 1919, and 1920 the writer studied 3,500 cases of smallpox. The variations in type and severity once more called attention to the possible difficulty in making a positive diagnosis early. This, of course, is of the maximum importance. Smallpox may be mild and atypical. Chicken pox may be severe and atypical. The results of an erroneous diagnosis are serious.

Chicken pox is commoner in young children; smallpox in adults. As a rule the prodromal and constitutional symptoms are much more severe in smallpox and last longer. Serious constitutional disturbances in varicella are usually only of a few hours' duration, or a day at most.

In smallpox one does not usually get those successive crops of eruption after the first appearance characteristic of varicella. In varicella the successive crops permit one to find in all parts of the body examples of the different stages of the eruption, e. g., papules, vesicles, crusts.

The papule changes to vesicle within 48 hours in variola. The same change in varicella requires only a couple of hours. Within a day the vesicles contain a clear fluid, which by the second day becomes purulent. Instead of vesicles, small bullæ may appear, which become slightly umbilicated by the second day. The vesicles dry on the third day, and then minute crusts develop, which soon fall off, leaving a macular discoloration lasting 10 to 15 days. The diagnosis between variola and varicella based on umbilication in the

former and its absence in the latter is unreliable. As a matter of fact, variola without umbilication is not very uncommon, or at least cases occur in which this phenomenon is limited. Some of the vesicles and some of the pustules may not be umbilicated in variola; umblication may occur in varicella.

In his observations the writer found that in variola the eruption began on the face and then extended rapidly to the upper and lower limbs. The trunk was affected last and least.

In confluent smallpox the trunk is involved, of course, but still not so markedly as the parts mentioned. With varicella the skin lesions are more numerous and marked on the trunk.

Again, it is important to remember that smallpox may develop with more than the usual speed, attaining the period of vesiculation in a few days. On the other hand, varicella may be initiated by severe constitutional disturbance of more than ordinary duration, the eruption appearing only two or three days later.

Where data regarding incubation and source of infection are lacking, differential diagnosis is always more difficult, especially in atypical cases.

In over 3,500 cases of smallpox studied, more than half had a more pronounced eruption on face and extremities than on the trunk, even in confluent and hemorrhagic types. (J. S. T.)

Schick, B. **The predisposing factor in diphtheria.** N. Y. Med. Jour. August 17, 1921.

In this article the author gives us a brief outline of the early history and later development of the intracutaneous test. He indicates the main points of the theoretical considerations and some of the experimental work which form its scientific basis and explains the cause of the clinical variations of the disease.

The discovery of the diphtheria bacillus has enabled us to recognize mild attacks of the disease. Bacteriologists early in their studies laid down the rule that diphtheria was present whenever the bacilli were found, and that, on the other hand, there could be no diphtheria without the organism. While the latter statement is true, the former requires certain modifications, as we know from the study of carriers which has revealed the full significance of resistance of the body to infection. We know now that the diphtheria bacillus is unable to attack his host unless the individual is predisposed to the infection.

"Numerous investigations have furnished reasons for the belief that carriers acquire the organisms by direct contact with other carriers or with persons actually suffering from diphtheria.

"Naturally, the question arises, why only a comparatively limited number of individuals, in fact chiefly children between the ages of 1 and 5, fall victims to the infection, while in the vast majority of the population the presence of the bacilli has no apparent consequences? Shortly after the Klebs-Loeffler bacilli had been identified as the causative organisms of diphtheria, it was demonstrated that antitoxic substances existed both in adults and in infants. These observations led to the formulation of the axiom that susceptibility to diphtheria was caused through lack of specific antibodies. Since that time it has been confirmed repeatedly that these antibodies are absent in children suffering from diphtheria."

On the other hand, the important fact has crystallized that diphtheria can not occur in individuals possessing protective bodies. Examinations on a large scale only became possible after the discovery of the Schick test—the intradermal injection of small quantities of toxin, namely, one-fiftieth of the minimum lethal dose for a guinea-pig weighing 250 grams. If the skin shows no reaction to the injection, the result is negative. In positive cases a sharply defined spot of erythema is noticed with an area of infiltration possessing a diameter of 10 to 30 millimeters. A negative result not only proves the presence of antibodies but also excludes the existence of diphtheria. It rules out the presence of diphtheria, even in cases where microscopic examination shows the presence of true diphtheria bacilli. In such instances we deal with angina occurring in carriers of the Klebs-Loeffler bacillus. Schick claims, therefore, that the intradermal test may carry more weight than the result of bacteriological examinations.

A positive Schick reaction only proves the absence of protective bodies. An infection does not always occur, even if antibodies are absent. This phenomenon may be due to mechanical protection derived from the intact mucous membrane against bacterial invasion.

It has been shown that antibodies are present in individuals after an attack, who had been unprotected previously. Just how long the immunity acquired persists is not known. It has generally disappeared a year after a severe attack; but immunity after mild attacks has not yet been studied by large scale investigations

Another aspect of the problem is the fact that the virulence of diphtheria shows such marked variations in different cases. These variations were at one time explained by presuming either changes in the virulence of the infecting organism or the presence of a mixed infection. This statement can not be maintained since animal experiment has clearly shown that no relation exists between the virulence of a strain of organisms and the severity of infection with this strain. The variations noted may be best explained by individual susceptibility.

Schick offers the following explanation of the phenomena of clinical variations in the disease: Persons may be subject to repeated attacks of diphtheria because the antitoxins produced in response to the infections and leading to its termination, disappear after convalescence. Fresh exposure may result in another attack, and the character of such repeated attacks may show variations in severity. Cases which manifest symptoms of decreasing severity in successive attacks may be explained by assuming that the body cells produce a more rapid and abundant formation of antitoxins, and the successive attacks are brought to a speedier conclusion. In cases which manifest symptoms of increasing severity in successive attacks, the cells fail to acquire the faculty of accelerated antitoxin formation.

The differences in the severity of first attacks in different patients are based on the same principle. It seems that the speed and quantity of antitoxin formation is a function of the body cells with a tendency to individual variations both as to speed of formation and to quantity of antitoxin produced.

Schick concludes that "In addition to the local protection derived from the intact mucous membrane, there are two factors producing immunity against diphtheria, the one is humoral in nature and its presence is determined by demonstrating and measuring specific antibodies in the serum; the other is the cellular factor, which is based on the varying faculty of cells to generate antitoxins."

"Humoral immunity signifies absolute protection as long as antibodies are circulating. Cellular immunity, while unable to prevent infection, determines the intensity and duration of the attack. The later and the less efficient the defense mechanism of cells reacts to the morbid stimulus, the later the effects of the organisms and their toxins can be counteracted, and naturally the more opportunity is given for the diphtheria bacillus to develop its dangerous activity. In this way we are able to interpret the malignant forms of diphtheria which are due to the complete inability of the body to defend itself against the toxins of diphtheria." (W. M. K.)

Ringer, A. I. **Chronic nephritis: From the point of view of the general practitioner, its diagnosis, prognosis, and treatment.** Am. Jour. Med. Sc. June, 1921.

During the year 1920, 536 men of the Navy were admitted to the sick list with a diagnosis of chronic nephritis in one of its several forms; of these men 17 died and 104 were invalided from the service. These figures show that this disease is encountered more or less frequently by naval medical officers, therefore a review of Dr. Ringer's paper may be of interest to some of them.

We are all familiar with the types of nephritis as taught by the pathologist—chronic parenchymatous nephritis with large white kidneys, chronic diffuse nephritis, chronic interstitial nephritis with small contracted kidneys, and amyloid kidneys—but up to the present the most careful work, examination of blood, urine and kidney functional tests have not yet enabled us to tell definitely whether in the living patient we deal with one type of kidney involvement or another. What we do know definitely is that we have a disturbance in the kidney function, and that the different patients group themselves according to the character of the physiologic disturbance and according to the severity of the disturbance.

When we say that a patient has a phthalein output of 35 per cent with a limited capacity for water and salt excretion while his nitrogen excretion is normal, or when we say that another patient has a capacity for normal phthalein output, excretes water and chlorides perfectly, but falls behind in his nitrogen excretion and shows retention of nitrogenous substances in the blood, we have a decidedly clearer way of classifying nephritic patients than if we follow a classification based on what we might expect to find post-mortem. In the first we can express the severity of the affection in definite mathematic figures and the progression or retrogression of the case can be followed. From the practical point of view the anatomic classification of nephritics must be abandoned and we must classify them according to their disturbed physiologic function.

Modern physiology has taught us that the function of the kidneys is not only to excrete urine—i. e., water and all the soluble waste products of metabolism—but to maintain the normal chemical constituents of the blood in proper equilibrium. And from the point of view of understanding what happens to the nephritic individual this is of the utmost importance.

The kidneys are composed of functional units which are made up of glomeruli, distal and convoluted tubules, loops of Henle, and collecting tubules. The glomeruli and loops of Henle are lined with flat endothelial cells, whereas the convoluted tubules have epithelial cells of the type that we find in all secreting glands. It is definitely established that water and salt are excreted mostly through the glomeruli, while the tubules, especially the convoluted portions, excrete most of the nitrogenous constituents like urea, uric acid, creatine and creatinine. The urine as it passes out of the glomeruli is of very low concentration, similar to that of the blood. In its passage through the various tubules water is reabsorbed, so that by the time it reaches the pelvis of the kidney the urine becomes vastly more concentrated than the blood.

On the bases of the above physiologic considerations we may readily see that any disturbance in the glomerular function will be

followed by a disturbance in the water and salt elimination, which means an accumulation of water in the tissues, with edema and general anasarca. A patient with this condition may have no trouble eliminating the products of protein metabolism like urea, uric acid, and creatinine. On the other hand, disturbances in the tubular portion of the kidney will cause interference with the elimination of urea, uric acid, and creatinine, while water and salts may be secreted perfectly.

All cases of nephritis belong to one or the other group in their early stages. In their later stages the whole system is likely to break down and there may be interference with both water, salt, and nitrogenous elimination. The tubular type is by far the most common.

To properly appreciate the development of the clinical history of nephritis we must bear in mind a few facts:

1. That the amount of kidney tissue that is possessed by any normal individual is much greater than his physiologic requirements, i. e., as far as excreting cells are concerned, we have a large factor of safety.

2. There are no subjective symptoms and there may be no objective symptoms for a long time after disturbance in the kidney function has set in.

3. That all the symptoms of nephritis are symptoms of deficiency in kidney function.

With these facts in mind we can readily see why the disease sets in so insidiously.

Ringer divides the cases met into four groups.

Group A.—In the early cases the patients feel perfectly well. They may have a slight elevation of blood pressure, 140 to 180 systalic and 75 to 80 diastolic. There may or may not be small traces of albumin and a few casts in the urine. Quantitatively the urinary output is normal, the nitrogen and the chloride elimination is perfect, while all the functional tests of the kidney show normal activity.

Group B.—The patients have some subjective symptoms. They tire easily. They may have frequent attacks of headache, with momentary dizziness; they may have slight shortness of breath and palpitation of the heart on exertion. Examination shows essentially the same findings as in Group A, except for the fact that the blood pressure may be higher and there may be decided left ventricular hypertrophy. The urinary examination may show albumin or casts. All the functional tests are normal and the blood examination is normal.

Group C.—The patients complain of frequent headache, dizziness, palpitation of the heart and shortness of breath on the slightest exertion, dark spots in front of the eyes, insomnia, anorexia, edema of the legs, puffiness under the eyes, ringing in the ears, and pain in the

precordium. The systolic blood pressure ranges between 180 and 280 and the disastolic between 80 and 150. The great majority of them show a good myocardium, with hypertrophied left ventricle, while other show decided evidence of failing myocardium, the symptoms depending upon the degree of cardiac insufficiency.

Group D.—To this group belong all those cases of nephritis which show unmistakable signs of kidney deficiency or decompensation.

The diagnosis of chronic nephritis in the later stages or when albumin or casts are present is a very simple matter. The difficulty is presented by those groups of cases which have negative urinary findings, i. e., no albumin and no casts, and still show a great many of the symptoms that we find in chronic nephritis, namely, high blood pressure, cardiac hypertrophy, arteriosclerosis, retinitis. Ringer suggests that chronic nephritis should not be diagnosed alone on the basis of the presence of albumin and casts but on the basis of the general clinical findings. He maintains that cases of essential hypertension, as they are termed by some clinicians, which exhibit the general clinical findings noted above should be considered potential chronic nephritis rather than essential hypertension.

The course of the disease in nephritis depends entirely upon the functional capacity of the kidneys, and by determining that we can foretell with a fair degree of accuracy what the result will be. Of course, we must ever be mindful of the fact that with chronic nephritis we do not deal with the kidneys alone but with a myocardium which may suffer insufficiency and with cerebral arteries which may rupture, all of which may upset our conclusions and direct the patient's course into different channels.

There are three functional tests employed to-day, each of which has its special advantages:

In the first test certain substances, as potassium iodide, lactose, and phenolsulphonephthalein, are administered to the patient and the speed with which they are excreted by the kidneys is studied. Of these substances phenolsulphonephthalein injected intramuscularly is the easiest to work with and gives a fairly reliable indication of the condition of the kidney. A kidney that has sufficient functioning cells to carry on the required excretion of the products of metabolism will excrete not less than 35 per cent of the phthalein during the first hour and about 20 to 25 per cent during the second hour, a total of 55 to 60 per cent.

Cases belonging to Groups A, B, and C give normal phthalein figures, because there are enough functioning cells left to carry on the work. The prognosis in these cases is good if the blood pressure is not above 200 systolic and 90 to 110 diastolic and if the heart is not irritable and only moderately hypertrophied. High diastolic pressure invariably presages myocardial trouble.

When there is only 45 to 40 per cent of phthalein elimination in the two hours it means that kidneys are beginning to fall behind in their work and that the patient is entering Stage D of the disease. Once the patient has entered this stage the phthalein output will keep sinking until a condition is reached in which there is no output at all.

The second functional test is made by a quantitative study of the urinary output. The test as it is carried out is based on the following consideration: If the urine of any normal individual is collected for 24 hours in two 12-hour portions, starting the first 12-hour period at 8 a. m. and closing at 8 p. m., and the second 12-hour period from 8 p. m. to 8 a. m. the following day, taking care the individual has his principal meal at noon, supper at 5 p. m., and does not eat or drink after that until the following morning, we find that the relationship of day excretion to night excretion for nitrogen is roughly 3 to 2 and for chlorides it is 3 to 1 or 4 to 1. The nocturnal water output will be less than 400 cubic centimeters. The reason for this is that a normal individual injests most of his food during the 12 hours of the day. As quickly as the products of digestion become absorbed and metabolized the products of metabolism, like urea, uric acid, chlorides, etc., enter the blood stream. As their concentration in the blood increases, the kidneys begin to excrete them in the urine. Normal kidneys respond so promptly that comparatively little is left for the night excretion. Therefore there is a comparatively low nocturnal water output and the ratio of day to night elimination of solids is as given above.

If the kidneys begin to fall behind in their work some of the material which in a normal individual would be excreted during the day is eliminated during the night, and the proportion of day to night chloride and nitrogen excretion will tend to approach each other. There will also be nocturnal polyuria, because with the excretion of more solid material during the night there is also excreted a larger amount of fluid.

Thus, by studying the shifting of the day to night ratios in the nitrogen excretion we can detect an approaching kidney insufficiency long before the blood figures change.

In addition to giving information of the degree of kidney function this test gives an idea of the special interference—whether it is water, chlorides, or nitrogenous materials that is excreted with difficulty.

The third test for kidney function consists of examining the blood for products of metabolism, urea, uric acid, and creatinine which are normally found in very small quantities and which are found very much increased in cases of renal insufficiency.

The blood of a normal individual in the morning before breakfast contains not more than 3 millograms of uric acid, 20 milligrams of

urea nitrogen, and 2 milligrams of creatinine per 100 cubic centimeters of blood. In renal insufficiency when the kidney first begins to fall behind in its work, the uric acid is retained first, hence any figure above 3 milligram is of diagnostic importance. Next the urea nitrogen begins to climb and may reach 150 or more milligrams per 100 cubic centimeters of blood. Lastly, the creatinine begins to rise, and when the creatinine concentration goes up to 5 milligrams per 100 cubic centimeters of blood death from uremia is imminent.

The treatment of chronic nephritis must be directly along three channels: To ameliorate the patient's symptoms and to make him comfortable; to attempt to check the progress of the disease; to prolong the patient's life.

The early recognition of Stage A is of the greatest importance in order that the patient may rearrange his mode of living. He should become moderate in his habits, not overeat, overdrink, overwork. He should not subject himself to unnecessary excitement. With the exception of a possible dose of bromides, to help tide over the nervousness caused by the disturbance in the patient's life, it is not advisable to use any medication at this stage.

What has been said for patients of Stage A is equally true for patients of Stage B. The physician's duty now lies in preventing the patient from doing things which might hasten a breakdown. If there is slight edema of the ankles, or if the blood pressure runs up too high, rest in bed for a week or two is indicated.

Patients who are classified as belonging to Group C suffer primarily from symptoms affecting the cardiovascular and nervous systems. The treatment is entirely symptomatic. Headaches, dizziness, palpitation of the heart, and shortness of breath form the chief complaints of most of the patients in the stage. Seldom will these symptoms be manifest in patients who have a blood pressure of less than 220 or 240. When this occurs the myocardium is usually at fault.

The remedies indicated are rest in bed, with bromides, 1 gram three times a day, and a diet restricted to low protein, low salt, low purins—i. e., cut out meat soups, tea, and coffee.

The treatment of the last stage of chronic nephritis, namely, Stage D, is a thankless task, as we are dealing with a patient who no longer possesses sufficient functioning cells in his kidneys to excrete the normal products of metabolism. The result is that these products tend to accumulate in the blood. A normal individual must receive a certain amount of protein to keep himself in protein equilibrium. The patient in Stage D can not receive that amount of protein. He must be kept on a protein intake commensurate with his ability to excrete nitrogen, and as the latter sinks the intake must be diminished. The rest of the treatment is largely symptomatic and should

be directed toward helping the body rid itself of the retained products and preventing the accumulation of new products.

Ringer closes his article with the following statement, which is the keynote of the treatment of chronic nephritis:

One should "consider every case of hypertension a potential nephritic and every nephritic a potential uremic, and treat the uremia not when it is with us and we are helpless, but months and years before, when we have every facility for its prevention. (W. M. K.)

SURGERY.

Ross, J. N. MacB. **First-aid work on shore with the Royal Naval Division.**

War surgery in the forward areas is mainly a matter of more or less advanced first-aid, prevention of shock, and quick evacuation to an immobile unit which in practice is the casualty clearing station. At the regimental aid post all treatment should be rapid and thorough so there will be no necessity for disturbing the patient again until he reaches the casualty clearing station, which is generally about 5 miles behind the lines and requires a journey of from 2 to 15 hours.

The medical officer soon learns that quick evacuation is the keynote of success, and the methods he adopts must always be subservient to this main consideration. He may send stretcher bearers to bring wounded in, or he may go to the firing line himself, but it is necessary always to bear in mind that he is only of use to his unit while he is alive and well. It is essential for him to run risks and face dangers, but this must never be done needlessly. On the other hand, a medical officer who always works in comparative safety at the bottom of a deep dugout and expects his stretcher bearers to bring all wounded to him will be sadly disappointed with the slowness of evacuation. He must be an example to his men, never asking them to do anything he would not do himself, and often personally superintending the bringing in of a casualty which is lying in a place of more than usual danger. If by exposing himself freely he can speed up evacuation, it is his duty to do so, but in no other case is it justifiable.

The choice of a location for a regimental aid post is largely dependent upon the military situation, which in stationary trench warfare differs greatly from that during an advance. When an attack is in progress both the medical officer, his orderlies, and stretcher bearers must carry on their persons everything which they may require. Ross's personal kit consisted of: (1) A Wildey hypodermic syringe pinned to the interior of the left breast pocket. (2) A bottle of morphia solution (one-half grain in 10 minims), fitted

with a rubber cap, attached by a safety pin in the same pocket. (3) Two water bottles—one full of water, the other of brandy (incidentally the service water bottle will hold the contents of two bottles of brandy). (4) A linen haversack containing first field dressings (shell dressings were not carried, as they are too bulky). (5) An instrument case in the right breast pocket. (6) A dozen triangular bandages in one side pocket. (7) Half a dozen St. John's tourniquets in the other. (8) A rubber tourniquet around the waist. (9) Every remaining pocket contained cigarettes, matches, and candles, whilst an electric torch was slung around the neck.

In stationary warfare the regimental aid post should be established in a dugout as near battalion headquarters as possible for purposes of communication and because every officer and man in the battalion quickly learns the position of headquarters and hence, when he is wounded, knows exactly where to find his medical officer.

Apart from the immediate saving of life, the main duty of the medical officer on the firing line is to do everything in his power to assist the healing of all wounds by first intention. In a large number of cases suppuration is prevented by early and complete excision of the wound. As this can not be done farther forward than the casualty clearing station, quick evacuation to that point is of the utmost importance.

In a Royal Naval Division, the regimental aid post was always situated near to and equidistant from the four companies of the battalion, i. e., close to battalion headquarters. It was manned by the regimental medical officer, his orderly, and five men of the medical unit. Attached to each company were four stretcher bearers, who kept in close touch with the regimental aid post and either notified the medical officer of casualties or brought them directly to him. The field ambulance stretcher bearers transported wounded from the regimental aid post to the advanced dressing station of the field ambulance. This was usually located about 2 miles behind the lines, and was the nearest possible point to which a motor ambulance could be brought.

In every attack it is essential that the battalion medical officer, prior to the offensive, should reconnoiter the ground and draw up a tentative plan for the collection and evacuation of his wounded.

The following treatment was employed by Ross at the regimental aid post: The wounded man was made as comfortable as possible and given a cigarette and a cup of cocoa. When he was thoroughly warm and comfortable the condition of his wound was investigated. The wound was exposed and the temporary first-aid dressing removed. The whole wound and the surrounding skin was thoroughly washed with pledgets of wool dipped in a solution of lysol. The

skin about the wound was thoroughly dried and then it (but not the actual wound) was painted with iodine. A large piece of gauze dipped in eusol was now applied to the wound and covered with wool and a bandage. Sand bags were wrapped around the limb to keep it warm and prevent soiling of the dressings. The man was then sent to the advanced dressing station of the field ambulance. The only modification of the above treatment was that if there were a rush of cases they were evacuated without redressing. (W. M. K.)

FISHER, A. R. **Immediate surgery of naval wounded in hospital yachts and small craft.** Jour. Roy. Naval Med. Service, July, 1921.

Surg. Commander A. R. Fisher, Royal Navy, reports his observations on the treatment of wounds received in action by officers and men of the Dover patrol, while attached to the hospital yacht *Liberty*.

The first-aid method employed on the destroyers consisted in the removal of clothing in the neighborhood of the wound, the application of iodine, and the complete covering of the wound with a compress of double cyanide gauze, and immobilization of the parts by slings, splints, or the Neil-Robertson stretcher. In some cases iodine was not used, the double cyanide gauze being applied to the wounds alone. Cases treated without iodine which were received shortly after being wounded did not develop septic complications.

Tourniquets were used too freely, and their unnecessary application in cases of slight hemorrhage which could have been controlled by a dressing endangered the recuperative powers of the tissues.

Diagnosis tags with details of the patient's name, rating, site of injury, and the amount of morphia given were attached to each man's clothing and were of great assistance on his arrival at the hospital ship.

Morphia was administered as a routine by all first-aid workers. Nothing less than one-half grain doses had any real effect. Men wounded in a naval battle seem to stand an abnormal amount of morphia, the excitement of the moment and the pain caused by their injuries acting as an antidote. Some of the less severely wounded in their state of reaction would often be noisy and troublesome; a small dose appeared only to stimulate and excite them further.

Preparatory to operation or dressing, as soon as the wounded were received on board, a one-half grain dose of morphia was always given to those who were noisy, restless, or complained of much pain, despite the fact that a similar dose probably had been given a few hours previously. The injured men were then divided into two

classes—those requiring treatment under a general anesthetic and those who could be dealt with at the dressing station. The wounded requiring an anesthetic were of two kinds—those who could be undressed, washed, and put to bed, and those who were too severely injured to permit of their being moved until their turn for operation had arrived; these latter were kept in their stretchers, morphia, extra blankets, and hot-water bottles applied.

Skin sterilization was effected by washing the part with ether soap and hot sterile water, shaving widely, washing away the soap with water, rubbing the surrounding skin with a swab soaked in methylated spirit, and spraying the wound and surrounding skin with iodine solution.

The main measure relied on for combating profound shock was intravenous injection of normal saline. Pituitary extract was found to be the most efficacious drug for raising the blood pressure, and was largely used.

The general anesthetic used was a mixture of chloroform, one part, and ether, two parts, given on an open mask. Anesthesia was easily induced with little struggling, due partly to the morphia previously given and partly to the constitutional reaction following the excitement of action.

In naval warfare, shell-fire is the commonest cause of wounds, the actual agent being either a fragment of the shell or a fragment of metal from the ship itself. The resulting wounds, whether perforating, penetrating, or superficial, are all lacerated, and frequently there is much bruising of the surrounding area.

The wounds may be divided for convenience into the following three types:

A. Shallow lacerated wounds.

B. Perforating wounds.

C. Penetrating wounds.

The treatment for each variety of wound was as follows:

TYPE A.

1. Sterilization of the surrounding skin.
2. Flush out wound with hot hypertonic saline, thus removing clot, etc.
3. Search for foreign bodies, such as metal, clothing, etc.
4. Excise skin margin of wound.
5. Cut off all frayed portions of muscle and subcutaneous tissue.
6. Secure bleeding points as far as possible.
7. Pack wound with gauze soaked in hypertonic solution.
8. Apply sterile dressing and bandage firmly.

TYPE B.

1, 2, and 3 as for type A.
4. Excise skin margins of both entrance and exit of wounds.
5 and 6 as in A.
7. Insert drainage tube, with frequent perforations, throughout the whole length of the wound, secure it by a suture at either opening, insert strips of gauze soaked in hypertonic saline from both openings alongside the drainage tube so that the gauze approximates within the limb.
8. As in A.

TYPE C.

1 and 2 as in A and B.
3. Excise skin margin and enlarge wound in the long axis of the limb as requisite to permit of thorough investigation.
4. Search for foreign body; in this type of wound a preliminary radiological examination is all important.
5 and 6 as in A and B.
7. Insert drainage tube to the limit of the wound and surround it with saline gauze.
8. As in A and B.

Primary suture was limited to wounds of the scalp and wounds involving joints. The author was not successful in primary suture of wounds in other regions. As the wounds in naval surgery are rarely, if ever, infected by *Bacillus tetani* and the anaërobic organisms which produce gas gangrene, he believes that the excision of a wound with its consequent destruction of tissue and loss of function is contraindicated.

Wounds complicated by compound fractures were best treated by the Carrel-Dakin method. In fractures of the jaw chloramin T is more suitable than sodium hypochlorite, as it is a blander preparation. In those cases where there was comminution the fragments were not removed unless they were completely detached, as these fragments were found to possess greater recuperative powers than similar fragments of long bones.

Like other surgeons, Fisher found it difficult to decide when immediate amputation should be undertaken. In doubtful cases he became convinced that amputation is the correct treatment. The amputation should be made through the seat of the fracture, as much skin and muscle as possible being saved, and after adequate drainage has been provided for the flaps should be approximated by interrupted sutures.

Open wounds with drainage tubes and gauze packs were dressed daily; the outer dressings were removed and the wounds irrigated with hypertonic saline. In noninfected wounds the inner gauze was

not removed for the first two days, after which both tubes and inner gauze were removed at each dressing. Infected wounds were dressed twice daily, hydrogen peroxide was instilled and followed by free irrigation with hot hypertonic saline.

Early removal of a foreign body should be undertaken if it is lodged near a joint, is lying on bone, or is in the neighborhood of a muscle origin or insertion.

The wounded were transported by either the Neil-Robertson stretcher or naval canvas cot. The Neil-Robertson stretcher was found to be invaluable for transporting serious cases to the decks of the hospital ship and was the most satisfactory method of moving patients along narrow passages and up narrow ladders. This stretcher has the additional advantages of immobilizing the body and limbs of the patient, and in cases of fracture of the lower limb it satisfactorily takes the place of a temporary splint.

The naval canvas cot makes a comfortable bed for a wounded man, but it is bulky (6 feet long by 2 feet 4 inches wide) and heavy.

Illustrations of these devices accompany the article and show their value. (W. M. K.)

SMITHIES, F. **Nonsurgical drainage of the biliary tract. Its usefulness as a diagnostic and therapeutic agent.** Illinois Med. Jour. Vol. XXXIX, No. 4.

The method of examination of duodenal contents as practiced by Max Einhorn and later by Rehfus, drew attention to the practicability of securing specimens of bile for examination by this route. In 1917 Meltzer, of the Rockefeller Institute, observed that when water solutions of magnesium sulphate were applied directly to the duodenal mucosa without such solutions having first come into contact with the gastric mucosa, there followed a readily recognizable relaxation of the muscular wall of the duodenum, a coincident relaxation of Oddi's sphincter at the papilla of Vater; within a brief period, contraction of the muscle-bundles in the gall bladder wall, and discharge of bile into the duodenum. Other substances such as peptone, belladonna, benzyl benzoate, permanganate solutions, water, foods, etc., and sometimes the tip of a duodenal tube will cause a relaxation of Oddi's sphincter but will not cause the secondary contraction of the gall bladder musculature which is only secured by water solutions of magnesium sulphate instilled directly into the duodenum.

The frequency with which gall bladder infection complicates lesions of the stomach and duodenum, and the fact that gall bladders which were seemingly innocent, stone free, and emptying freely upon compression gave the greatest percentage of positive cultures when the tissue and bile were examined bacteriologically make the careful

examination of biliary tract aspirates a highly important preoperative procedure.

The patient is seen after he has fasted for 12 hours. He scrubs teeth and gums for 5 to 10 minutes with a good tooth paste, then rinses his mouth thoroughly and gargles with a one-half per cent formalin solution. A sterile duodenal tube (preferably the Rehfus type) is slowly fed to him until the bulb reaches the stomach. Careful lavage of the stomach is then performed with an abundance of sterile water at 80° F., followed by a second lavage with hot 3 per cent liquor antisepticus solution until the fluid returns perfectly clear. Then with the patient lying in the Sims' position he swallows 10 to 20 centimeters more of tube in order that the duodenal bulb may pass through the pylorus. In the average subject this occurs in from a few minutes to one and one-half hours. Where obstinate pyloric spasm holds the tube in the stomach, its passage is facilitated by passing through the tube into the stomach, 1 to 2 drachms of 20 per cent solution of benzyl benzoate in 2 ounces of sterile water or 20 drops of tincture of belladonna. The entrance of the bulb into the duodenum is proved by the constant aspiration of pearly-gray alkaline, pancreatic juice often bile tinged, by the peristaltic "tug" of the active duodenum, and by the patient's subjective sensation of the bulb passing the pyloric sphincter. With the bulb 10 to 15 centimeters beyond the pyloric ring, careful duodenal lavage first with sterile water at 80° F. and then with 3 per cent liquor antisepticus solution is carried out until the solution returns perfectly clear. Twenty-five cubic centimeters of 33 per cent water solution of magnesium sulphate at a temperature of 85° F. is slowly introduced. This solution is allowed to remain in the duodenum for from one to three minutes and is then slowly aspirated by a glass syringe. Then there are secured from 2 to 15 cubic centimeters of thin, light, golden yellow bile from the common duct followed by from 30 to 100 cubic centimeters of thick sirupy, brownish gold bile from the gall bladder. The flow of gall bladder bile stops abruptly and after this, by persistent aspiration, light golden yellow bile can be secured from the hepatic ducts.

In about 11 per cent of patients it is not possible to secure bile from the gall tract at the first attempt, due to marked pyloric spasm, kinking of the duodenal tube, failure of the bulb to lie in proximity to the papilla of Vater, failure of the magnesium sulphate to arouse Meltzer's duodenal reflex, occlusion of the ducts, and to not-yet-understood inhibitory reflexes. On the second and third attempts the percentage of unsuccessful aspirations is reduced to about 4. If duodenal residues are repeatedly secured without common duct bile, it indicates obstruction at or adjacent to the papilla of Vater. If

bile is secured from the common and hepatic ducts but no gall bladder bile and with an associated palpable enlargement of the gall bladder, it indicates obstruction in the cystic duct. If the hepatic duct bile is loaded with pus, blood, or precipitated bile salts it indicates a condition which would not be benefited by operation.

In 1,000 patients where operation disclosed definite gall bladder pathology, biliary tract aspiration revealed infection in only 63 per cent, but besides infection there can be found abnormal quantities of bile from the different segments, thick mucoid bile, small calculi and pus, and desquamated epithelial cells. Any constantly alkaline duodenal aspirate which is turbid, blood or pus or mucus laden can be considered as coming from an abnormal duodenum, the seat of ulcer or chronic inflammation. An alkaline common bile duct fraction of greater volume than 15 cubic centimeters suggests local stasis. If the bile is turpid, of specific gravity greater than 1.015, exhibits gross blood, pus, crystals, calculi, strings, or flocculi of mucus and on standing deposits an abundant sediment it means duct disease. Gall bladder bile fractions of more than 100 cubic centimeters and with specific gravity higher than 1.020 are abnormal and indicate bile stasis. If it contains blood, pus, sand, mucous gobs, or abnormal color it indicates active disease. Hepatic duct bile shows the fewest anomalies except in quantity; the normal quantity is 5 to 15 cubic centimeters.

Microscopic study of aspirated bile should be instituted as soon as possible after the specimen is secured. Stained and unstained specimens should be examined. Cultures should be made in bouillon, on plain and blood agar, in glucose broth and modified Drigalski-Conradi media. Cultures should be incubated for a week to 10 days before they are said to be sterile. The following organisms are recovered: Colon type bacillus, streptococcus, colon-typhoid group, staphylococcus, influenza-like bacillus, and coccus, Micrococcus catarrhalis and diphtheroid bacillus.

Nonsurgical biliary tract drainage is indicated in acute infectious choledochitis or cholecystitis in association with acute infectious ailments as pneumonia, typhoid, etc., in cases of biliary stasis with or without infection in association with acute or chronic heart disease, in the liver cirrhoses with gall tract stasis, in gall tract stasis in the anemias or leukemias, or in diabetic patients and in many other conditions where there is dyspepsia or other intestinal symptoms due to biliary stasis or infection.

After each biliary tract aspiration, the duodenum is thoroughly lavaged through the tube with several liters of 3 per cent liquor antisepticus solution and before the tube is withdrawn an ounce of castor oil or 2 drachms of extract of cascara is instilled into the

duodenum to hasten the elimination of any foul bile which may remain. Frequent small feedings are also advised to stimulate the demand for bile and thus prevent stasis.

Each patient upon whom cholecystectomy or cholecystostomy has been done should have biliary tract aspirations and careful examination of specimens to determine absence of infection. If infection still persists appropriate treatment can be instituted. It is recommended that all patients who have had gall bladder operations should have diagnostic biliary tract aspiration twice yearly. (W. L. H.)

TROPICAL MEDICINE.

Ranson, B. H., and Cram, E. B. **The course of migration of ascaris larvae.** Am. Jour. Trop. Med. June, 1921.

These authors have substantiated the findings of Stewart, that when eggs of ascaris lumbricoides containing fully formed vermiform embryos are swallowed, they hatch in the intestine and release the embryos which do not immediately settle down, but leave the intestine and pass to the liver, then to the lungs, and finally back to the intestine by way of trachea, esophague, and stomach.

They have followed the progress of the larvae step by step, showing that the latter are common in the portal vein one and two days after injection; that they become numerous in the liver in their 24 hours after infection, brought to that organ in the portal circulation. After the seventh day no larvae were found in the liver. It was further shown that a large number of larvae pass along the vena cava within 24 hours, where they also may be found up to the seventh day.

Larvae were also removed from the right side of the heart, from where they pass to the lungs in the pulmonary arteries. For a period of from 4 days to 10 or 12 days after infection the larvae can be found almost invariably in the lungs of animals that have swallowed large numbers of eggs. From the lungs the larvae migrate to the intestine through the trachea and esophagus. (E. P.)

Cawston, F. G. **The treatment of fluke diseases.** Jour. Trop. Med. October 1, 1921.

Various species of fresh-water snail were found living on the water cress in the Durban suburbs, and that a large proportion of these were infested with the cercariae of *Schistosomum haematobium* and to a less degree with *S. mansoni.* He also found the cercariae of *Fasciola gigantica* encysted on lettuce.

The author speaks about the use of copper sulphate solution in fluke-infected pools, and also the introduction of ducks as a means of keeping collections of water free from fresh-water snails. He reports two instances in which these methods apparently accomplished the desired result.

Dr. Cawston emphasizes the importance of treatment of the Bilharzia carrier in the control and possible eradication of these chronic diseases from a country. He followed up 100 cases of infection with *S. haematobium* treated with intravenous injection of tartar emetic and found that after a month's treatment the patient no longer was capable of spreading the infection. The author's experience with ipecacuanha seems to indicate that this drug is also effective in eradicating infections with *S. haematobium* and *S. mansoni.* (E. P.)

Broughton-Alcock, W. **Laboratory observations on pensioners who contracted malaria in the late war.** Proc. Roy. Soc. Med. October, 1921.

The Ministry of Pensions is at present very much interested in the diagnosis of latent malaria, owing to the number of demobilized soldiers who have returned from the East where they contracted the disease and are now claiming pensions on the score that they still suffer from relapses. The author shows that a relative increase of large mononuclear or endothelial leucocytes (including macrophages, hyaline and transitional mononuclears and monocytes, but not the large lymphocyte cells) is not a constant factor in latent malaria, even when the most reliable diagnostic clinical sign, an enlarged spleen, is present and the clinical diagnosis of latent malaria is obvious. He finds noteworthy the fall in the percentage of findings of the parasite and of clinical signs, enlargement of spleen, presence of anemia, cardiac abnormality as time lengthened from the date of the first attack of malaria. (E. P.)

Yorke, W., and Adler, S. **Note on a case of leprosy.** Ann. Trop. Med. and Parasit. September 30, 1921.

These authors report a case of leprosy in a native of Hongkong who arrived in England in 1912 in good health and was employed until a short time ago as a laundryman in Cardiff. In 1916 he noticed for the first time small spots on left side of face. Within last year the eruption appeared on the trunk and upper and lower limbs, later followed by swelling of *alae nasi.* The various lesions showed the presence of numerous lepra bacilli. (E. P.)

Scott, H. H. **The prevalence and character of tuberculosis in Hongkong.** Ann. Trop. Med. and Parasit. September 30, 1921.

The experience of this author as medical officer in charge of the mortuary showed that tuberculosis was a frequent cause of death in Hongkong. He found that a large percentage of children of tender age died from this disease. With regard to the theory of diathesis or the hereditary transmission of constitutional predisposition to tuberculosis the author apparently endorses the modern conception "that it is being relegated more and more to the realms of improbability as modern knowledge, with its insistence on accuracy of detail, demands facts and proofs in place of nebulous hypotheses."

The author shows how the overcrowding, insanitation, and squalor of the houses in the poorer sections of Hongkong coupled with the absence of any sanitary conception on part of the Chinese give all the opportunity in the world for tuberculosis to spread and reap the large harvest it does. The author emphasizes the importance of educational measures through such agencies as the Y. M. C. A. and Y. W. C. A. as the means to instill into the minds of the Chinese the proper regard for simpler hygienic rules.

After giving a short survey about the portals of entry of tuberculosis as accepted of importance to-day, the author reports a series of 300 cases on which he performed autopsies.

The following table shows the results obtained:

Portal of entry.	Number.	Percentage.
Respiratory tract	209	69. 66
Not determined but probably the respiratory tract	7	2. 34
Alimentary tract	32	10. 66
Not determined but probably the alimentary tract	5	1. 67
Simultaneously in above tracts	4	1. 34
Not determined	43	14. 33
Total	300	100

Two hundred and twenty-five cases were children under 10 years of age, of which 68 per cent showed the respiratory tract as portal of entry and 15.11 per cent gave evidence of the alimentary route. Four cases of isolated primary tuberculosis of the intestine were found. (E. P.)

Gordon, R. M., and Young, C. J. **The feeding habits of stegomyia calopus, Meigen.** Ann. Trop. Med. and Parasit. September 30, 1921.

These authors performed an experiment with a view to investigating the feeding habits of *S. calopus* under as natural conditions as possible. After the first feeding the mosquitoes were "marked" by

amputating the hindlegs through the tibæ and then kept in captivity for at least 14 days before they were released. The authors conclude that *S. calopus* females will bite either by day or night, over 14 days after their first blood meal while under no artificial restraint and having opportunities of selecting day or night for feeding. (E. P.)

LUCEY, H. C. **Observations bearing on the reliability of the large mononuclear leucocyte count as an aid to the diagnosis of malaria.** Proc. Roy. Soc. Med. October, 1921.

This author made some very interesting observations when working on the difficult problem of diagnosing latent malaria without finding the parasites. The recognized fact that at some stage during an actual attack mononuclears may be increased, brought up the questions of how long they are kept up and if a decided increase in the large mononuclears in a man who at some previous period is known to have had malaria necessarily means that he is still suffering from malaria in a latent form or some other disease associated with an increase in these cells. The author shows how a perfectly normal individual will show a decided increase in the large mononuclear leucocytes when the smear is made from the first drop exuding from the pricked ear lobe. He shows how the error is due to a concentration of the large mononuclear leucocytes in the ear capillaries, caused by retarded circulation in the ear owing to its immobility and the absence of muscular contraction. He therefore advises that the ear should be rubbed or massaged before puncture, and no drop earlier than the third used. The blood taken from the finger is always reliable whether the finger is rubbed or not, provided excessive squeezing is avoided. (E. P.)

CHEMISTRY.

ALLEN, F. M. **Experimental studies in diabetes.** Am. Jour. Physiol., 1921, LIV, 425.

There is no demonstrable difference in the proportion of pancreatic tissue that must be removed to produce diabetes in dogs in warm or cold environment. The influence of cold is not equivalent to the removal of the smallest fraction of a gram of pancreatic tissue. Cold environment usually but not always caused hyperglucemia, more easily and in higher degree as the power of sugar utilization was impaired.

Senile dogs do not seem to differ in susceptibility to diabetes (as the result of partial depancreatization) from normals. The tendency to diabetes is distinctly less in puppies than in adult dogs.

Partial pancreatectomy in dogs shows that diabetes is not seriously aggravated by the increased metabolism of pregnancy. The experiments are opposed to the view that any appreciable amount of internal pancreatic secretion passes from the fetus to the mother. (C. W. O. B.)

Allen, F. M., and Wishart, M. B. **Experimental studies in diabetes.** Am. Jour. Med. Sci., 1921, CLXI, 165.

Experimenting upon dogs, it was found that (*a*) the increased metabolism of exercise does not impose an added strain upon the internal pancreatic function; (*b*) the combustion of food materials through the increased muscular metabolism and mass resulting from exercise is a definite relief to the internal pancreatic function as compared with the accumulation of such materials through inactivity; (*c*) the internal pancreatic secretion is an indispensable intermediary in such combustion, and that exercise merely enables the muscles to make more active use of such quantity of this available secretion, but can not compensate when this quantity falls below the necessary minimum.

For practical treatment the combustion of food by exercise is preferable to its deposit in the body, but exercise can not replace dietary restriction nor permanently atone for excessive diets.

The value of exercise is as a form of undernutrition. The combustion of calories by exercise is not as beneficial as the omission of them and loses its potency at a stage when dietetic undernutrition is still effective.

Impairment of sugar utilization by exercise occurs only in the extreme stages of diabetes, but in human patients the nervous and systemic influences must also be considered. With any important degree of undernutrition, heavy exercise involves undesirable fatigue and strain, but light exercise aids health. Rest is necessary in the severest cases.

In the clinical application, dependence for the control of the diabetes is placed upon diet, and exercise is limited to the requirements of comfort and hygiene. (C. W. O. B.)

Bessonoff, N. **Antiscorbutic action of raw potato.** Bull. Soc. Hyg., 1921, VIII, 622.

Experiments upon guinea pigs proved that intact raw potato had a pronounced antiscorbutic action equal to that of cabbage or dandelion. The pulp of potatoes crushed and pressed in a hydraulic press and fed in amounts equal to that of the intact potato had a very slight antiscorbutic action. The juice was antiscorbutic but less so than

an equivalent amount of intact potato. The juice added to the pulp appeared to reinforce but slightly the antiscorbutic action of the latter. (C. W. O. B.)

ROSENBLOOM, J. **Diet in hyperthyroidism.** Proc. Soc. Exper. Biol. and Med., 1919, XVII, 28.

The author claims to have obtained clinical evidence that diet in such cases should contain the minimum amount of protein and that foods low in iodine content should be selected. (C. W. O. B.)

BURKE, V., ALDER, J. C., and PISCHEL, D. **Botulism.** Arch. Int. Med., 1921, XXVII, 265.

The authors believe that infection in human beings following the ingestion of toxin-free organisms never occurs, but that the organism does produce toxin in the alimentary tract following the ingestion of preformed toxin and after paralysis has set in. They recommend that in outbreaks of botulism, as soon as the first case develops, a polyvalent immune serum should be injected intravenously in all persons who have partaken of the suspected food. Oils (olive, etc.) and ethyl alcohol are indicated for use by stomach, and oil and soap as high enemas. (C. W. O. B.)

GIBSON, R. B., and MARTIN, F. T. **Pituitary extract and histamine in diabetes insipidus.** Arch. Int. Med., 1921, XXVII, 351.

In a severe case of diabetes insipidus no relief was obtained by lumbar puncture. Pituitary extract (1 cubic centimeter of the obstetrical preparation subcutaneously twice daily) reduced the volume of urine from 15 to 4.2 liters. Dried whole gland (four times 3 grains by mouth) had only a very slight effect. Histamine-HC (0.2 grams injected) had similar but less effect than the extract. (C. W. O. B.)

NOGUCHI, H. **Test for protein in the cerebrospinal fluid.** Jour. Am. Med. Assn., 1921, LXXVI, 632.

To make a test, add gradually with mixing one part of solution 1 to nine parts solution 2 (if the order is reversed, the test is spoiled). Place 0.1 cubic centimeter cerebrospinal fluid in a 10 by 1 centimeter test tube and 1 cubic centimeter of the mixed solutions. A normal spinal fluid remains clear or faintly opalescent. Increased albumin or globulin gives a dense general turbidity. A dense flocculation occurs with bacterial meningitis or general paresis. The maximum

opacity is reached in a few minutes at temperatures ranging from that of the ice box to that of the incubator. A mild reaction is indicated by a slight general turbidity, best seen by reflected light.

Solution 1 is prepared by putting beet heart through the sausage machine, and then completely drying it by a fan over a heater. Extract 100 grams of the dried substance with 1,000 cubic centimeters acetone at room temperature for five days with daily shakings. Discard the acetone, remove the remainder by evaporation and extract for five days with 1,000 cubic centimeters absolute alcohol at room temperature. Remove the yellow alcoholic extract from the solids, and test for suitability by mixing a sample with solution 2 in the ratio of 1:9. It is suitable if no marked opalescence develops.

Solution 2 is prepared by dissolving 4 grams NaCl and 1.5 grams KH_2PO_4 in 990 cubic centimeters H_2O containing 0.5 cubic centimeter glacial acid, and adding 10 cubic centimeters saturated solution of picric acid in absolute alcohol. (If this solution is not to be kept in the refrigerator, make it 10 times as strong, i. e., dissolve the given amounts in 90 cubic centimeters H_2O; before use, dilute with 8 parts of water.) (C. W. O. B.)

Sullivan, M. X., Stanton, R. E., and Dawson, P. R. **The urine in pellagra.** Arch. Int. Med., 1921, XXVII, 387.

Casts or albumin or both were found in about 50 per cent of the cases, but some cases of marked pellagra showed no evidence of kidney change. Metabolism experiments indicated poor protein absorption with intestinal putrefaction. The per cent of total N as urea was low; that as ammonia and undetermined N was high. Creatinine content and coefficient were low. After a month on remedial diet, there was a return to normal relations among the nitrogenous constituents of the urine, but the absorption of N remained poor for a longer time. The abnormalities in the urine were greater in the systemic than in the dermal type. (C. W. O. B.)

Farrar, L. K. P. **Acidosis in operative surgery.** Surg., Gynec., Obst., 1921, XXXII, 328.

The carbon dioxide combining power of blood plasma in women is about 8 vol. per cent lower than for men. Hence, the danger line is sooner reached, which accounts for the greater frequency of acidosis following operations upon women than upon men. The fall of alkali reserve during operation depends not only upon the anesthetic and the duration of the operation, but also upon the nature of the latter and the occurrence of hemorrhage and shock, bearing a close relation to fall in blood pressure. A solution of glucose given

intravenously during operation, at the rate of 0.8 gram per kilogram body weight each hour lessens the acidosis incident to operation by promoting metabolism. A solution of gum acacia (6 per cent) in 20 per cent glucose given at a subtolerant rate throughout the operation is an aid to the maintenance of blood pressure. Carbohydrate feeding before and after operation together with the use of sodium bicarbonate will help to prevent or lessen acidosis. (C. W. O. B.)

Feigl, J. **Fats and lipoids in the blood after hemorrhage.** Biochem. Ztschr., 1921, CXV, 63.

Lipemias of varying degrees of intensity tend to follow any marked loss of blood by the organism. (C. W. O. B.)

Takeuchi, K. **Albumin, lymphocytic cells, and tubercle bacilli in the sputum.** New York Med. Jour., 1921, CXIII, 574.

When the bacilli are present, albumin, lymphocytes, and eosinophiles also are usually present. When no bacilli are present, none of the others are found. (C. W. O. B.)

Desmarest, E., and Lascombes. **Nitrous oxide and cholemia.** Presse med., 1921, XXIX, 194.

After use of ether and chloroform for general anesthesia, a pronounced cholemia appears which takes five to six days to disappear. A mixture of nitrous oxide and oxygen never produced cholemia, indicating that this anesthetic does not affect the liver. (C. W. O. B.)

Horovitz, A. S. **The lipoids in the treatment of drug addiction disease.** Am. Med., 1921, XXVII, 42.

Horovitz believes that drug addiction is caused by a marked decrease or deprivation of lipoids from the system. On the basis of this, he developed a mixture of plant lipoids capable of relieving drug addiction disease in man. Experiments upon dogs showed that the administration of the mixture prevented the acute symptoms usually following withdrawal of morphine. Similar tests on patients were successful. (C. W. O. B.)

Heinkamp, W. J. R. **The modification of the action of adrenaline by chloroform.** Jour. Pharmacol. and Exper. Therap., 1920, XVI, 247.

Chloroform is toxic for heart muscle, producing or tending to produce weakening of that organ. Inhibition under chloroform anes-

thesia after adrenaline is due primarily to the toxic or paralytic dilatation of the heart. Because of the action of chloroform on the heart, adrenaline is contraindicated whenever chloroform is employed and chloroform when adrenaline is used. The adrenaline action is peripheral since it occurs after section of the vagi. (C. W. O. B.)

HAGGARD, H. W. **Anesthetic and convulsant effects of gasoline vapors.** Jour. Pharmacol. and Exper. Therap., 1920, XVI, 401.

In general, gasoline vapor has an anesthetic action somewhat like that of ether, but with marked convulsant effects, due doubtless to irritation of the cerebral cortex. Thus the stage of excitement, common in ether anesthesia, is marked by convulsions under gasoline vapor. The stage of full anesthesia between consciousness and death is very narrow. The toxicity of a given amount of gasoline vapor is vastly less than that of the CO produced by its incomplete combustion in an engine. (C. W. O. B.)

MACHT, D. I. **Absorption of local anesthetics through the genito-urinary organs.** Jour. Pharmacol. and Exper. Therap., 1921, XVI, 435.

The local anesthetics (cocaine, alypin, and apothesin) are more or less readily absorbed through the urethra, ureters, pelvis of the kidney, prepuce, and vagina, but are very poorly absorbed from the urinary bladder. (C. W. O. B.)

ADLER, E. **Occult blood in the feces.** Arch. f. Verdauungs kr., 1921, XXVII, 153.

Adler advocates as an essential for proper procedure the use of a diet for a preliminary period of nine days in which all traces of hemoglobin-containing foods have been eliminated. (C. W. O. B.)

SEEDORF, J. **Use of iodine for disinfecting the skin.** Act. Chirurg. Skand., 1920, LII, 436.

Testing against liquid cultures of S. pyogenes aureus and tetanus bacilli, the best results were obtained by the use of a solution of iodine (up to a maximum of 1 per cent) in 50 per cent propyl alcohol A solution of iodine in 96 per cent alcohol also gave good results, while aqueous and ethereal solutions were nearly as effective, but a solution in benzene had only a slight sterilizing action. (C. W. O. B.)

Aron, H., and Gralka, R. **The remarkable food value of various fats.** Biochem. Ztschr., 1921, CXV, 188.

Prolonged feeding experiments afford further evidence that certain edible fats contain remarkable accessory food factors entirely independent of their caloric value.

The experiments showed that a prolonged diet of a fat-poor nature or one in which the fat had a low biological value ultimately brought the animal to a bad condition in spite of high food intake. Margarine is one of the substances producing this deleterious effect. Butter, egg, and cod-liver fat all brought about favorable reaction. (C. W. O. B.)

Boenheim, F. **Studies in chloric metabolism.** Stuttgart, Ztachr. Exp. Med., 1921, XII, 295.

The chlorine content of the gastric secretion is independent of the blood content within very wide limits, and it is only when the body is markedly deficient in chlorine that the chlorine content of the gastric juice becomes diminished.

Ten grams of sodium chloride by mouth in a glass of water produces a decrease in chlorine content of the blood in about 20 minutes when gastric secretion is normal. In gastric disturbances the chlorine curve is straight, while with marked secretory disturbances there is a reversal of the normal curve, i. e., a rise instead of a fall.

The internal secretions of the adrenal and thymus lower blood chloride, while that of the epiphysis has no effect. Those of the thyroid, anterior lobe of the hypophysis, ovary, and testicle increase blood chloride and calcium.

Various diseases showed the following effects upon the blood chlorides:

Pernicious anemia—marked increase.
Hypothyroidism—increase.
Osteomalacia—none.
Malignancy—none.

Amati, A. **Urine hemolysis coefficient.** Policlinico, Rome, 1921, XXVIII, 287.

The hemolytic power of normal urine was tested after the addition of graduated amounts of distilled water. Hemolysis did not occur until normal urine had been diluted about fivefold, but in cancer the ratio was reversed, hemolysis occurring with the addition of one-fifth part of water. In chronic nephritis hemolysis occurs with a much smaller addition of water to the urine than in the case of urine from healthy persons. It is suggested that these facts may aid in the diagnosis of cancer and nephritis in obscure cases. (C. W. O. B.)

PONDER, E. **The presence of hemolytic substances in human urine.** Brit. Jour. Exp. Path., 1921, II, 34.

Using the technique of McKee (Chem. Abst., X, 217), hemolytic activity was observed as a regular occurrence in the urines of insane persons and also in the urines of healthy persons. The hemolytic substance appeared to be a stable chemical compound, capable of being extracted from the urine by various solvents. Its hemolytic activity was inhibited by various substances, such as dilute alkalis, lipoids, cerebrospinal, orchitic, and other body fluids, and notably blood serums. As bile acids and their salts are very highly hemolytic and are inhibited in their hemolytic activity by these same substances it is probable that the hemolytic power of urine depends upon its containing minute traces of bile acids or their salts, and that the occurrence of hemolytic activity in urine is physiological. (C. W. O. B.)

GRAHAM, G. **Glucemia and glucosuria.** Lancet, London, 1921, I, 951.

After a carbohydrate meal there is a slight rise in blood sugar which may last for several hours. Levulose produces practically no rise in blood sugar after doses of 50 grams.

It is probable that the excess sugar is stored in the liver, muscles, and elsewhere, and that only a small part is burned immediately. The liver is not the chief storehouse for sugar in the body. Experiments in which the liver has been cut out of the portal circulation and those in which the liver is seriously damaged in disease show that the muscles play an important part in the storage of glycogen, and it is possible that "extra sugar" in the blood after a carbohydrate meal is on its way to the muscles.

The complete disappearance of 25 to 50 per cent of the sugar which has been injected is remarkable, and suggests that it has been converted into another compound which escapes detection.

At present three substances are known which play an important part in sugar metabolism. Cohnheim's substance, which is thermostabile, soluble in alcohol, and inhibited by trypsin, is apparently necessary for the storage of sugar in the muscles. Dakin and Dudley's substance, which is thermolabile, water-soluble, unaffected by trypsin, is apparently necessary to prevent the conversion of sugar into lactic acid. Clark's substance, which is thermolabile, water-soluble (and in diabetic animals must pass through the liver as well) is necessary to enable the muscles to burn the sugar.

There is evidence to indicate that the diabetic is unable to store sugar readily, and that it circulates in the blood for a longer period than usual. This effect may, perhaps, be ascribed to the absence

of Cohnheim's substance in adequate amounts. The persistence of hyperglucemia in severe diabetes, in spite of starvation, may be due to absence of Dakin's substance in adequate amounts. The incomplete burning of sugar in diabetes may be due to deficiency in Clark's substance.

The mechanism regulating the amount of sugar in the blood is a complicated one and involves the action of the glands of internal secretion. (C. W. O. B.)

Nielsen, C., and Higgins, J. A. **The pharmacology of some benzyl esters.** Jour. Lab. Clin. Med., 1921, VI, 388.

Emulsions of benzyl compounds in gum acacia are most favorable for intravenous administration. Marked intestinal relaxation follows the injection of benzyl benzoate and cinnamate, the latter being the more active. Both compounds diminish the contractions caused by barium chloride. The cinnamate lowers blood pressure less than the benzoate. Benzyl cinnamate is inactive when administered orally. The coagulating time of the blood is not affected by the injection of these drugs. (C. W. O. B.)

Jolles, A. **Indican in water as an aid to hygienic water analysis.** Berd. deutsch. pharm. Gesellsch., 1920, XXX, 421; J. Chem. Soc., 1921, CXX, 69.

The presence of the merest traces of indican in water is a certain indication of previous contamination with animal excreta. As its detection by chemical means is very simple and not interfered with by the commonly occurring constituents of natural waters, except nitrites, which are readily eliminated by means of ferrous salts, its presence or absence forms an excellent criterion for the judgment of a water from the hygienic point of view.

Evaporate 3 to 4 liters of the water to 250 cubic centimeters and, if nitrites are present, add 3 grams $Fe(NH_4)_2(SO_4)_2$ for every 0.1 gram of nitrite per liter of the original water. Continue evaporation to 10 cubic centimeters, filter, and add to the filtered solution 1 cubic centimeter 5 per cent thymol or alpha-naphthol in alcohol and 10 cubic centimeters fuming HCl containing 5 grams $FeCl_3$ per liter. Shake frequently for 15 minutes and extract by careful shaking with 4 cubic centimeters of chloroform. The indolignone coloring matter will have been formed if indican were originally present. A reddish or bluish violet color of the chloroform layer, however slight, is a certain proof of the presence of indican. (C. W. O. B.)

BARBOUR, H. G., and HERRMANN, J. B. **The relation of the dextrose and water content of the blood to antipyretic drug action.** Jour. Pharm. and Exper. Therap., 1921, XVIII, 165.

"Sodium salicylate, acetyl-salicylic acid, antipyrine, and quinine all increase the blood sugar concentration in both normal and fever dogs. After salicylates the total blood dextrose increase, as determined by the Benedict method, amounts to from 25 to 50 per cent. The increase appears smaller when estimated by the method of Folin and Wu. Antipyrine apparently gives a less marked effect than do the salicylates, while quinine exhibits a greater.

"In coli fever dogs as well as in human febrile cases these drugs produce a notable dilution of the abnormally concentrated blood. This dilution accounts for the decrease in body temperature.

"In normal dogs antipyretic drugs often increase the body temperature slightly, in which case they may diminish the fluid content of the blood.

"According to the theory of antipyretic action evolved from our work the mobilization of dextrose is one of the chief factors responsible for the blood dilution by antipyretic drugs in fever. (C. W. O. B.)

BARBOUR, H. G., and HJORT, A. M. **Toxic effects of chlorine antiseptics in dogs.** Jour. Pharm. and Exper. Therap., Oct., 1921.

"Given intraperitoneally in dogs, chloramine-T appears to possess one and one-half the toxicity of Dakin's solution and but one-fifth the toxicity of corrosive sublimate.

"All three of these antiseptics produce acute or chronic peritonitis, the severity depending upon the amount injected.

"Fatal intraperitoneal injections of chloramine-T appear not only to fail of absorption but to attract in addition at least an equal amount of fluid from the circulation.

"All of the above-mentioned antiseptics produce circulatory and muscular collapse with reduction in body temperature.

"Large amounts of 2 per cent chloramine-T by mouth can be tolerated by dogs without other significant effect than vomiting." (C. W. O. B.)

HOSKINS, R. G. **The reaction to epinephrin administered by rectum.** Jour. Pharm. and Exper. Therap., Oct., 1921.

The results of experiments upon dogs and cats "indicate that rectal injections of epinephrin are roughly comparable in quantitative effects to intramuscular injections. Either none or only relatively slight pharmacodynamic reactions were obtained: when se-

cured these persisted from a few minutes to an hour. For studies in pharmacodynamics the method seems too uncertain in its results to be of much value. The data as a whole indicate that absorption does occur, but at a relatively slow rate." (C. W. O. B.)

Myers, V. C., and Killian, J. A. **Studies on renal excretion.** Jour. Pharm. and Exper. Therap., October, 1921.

"Phenylcinchoninic acid (cincophen) and the ethyl ester of paramethylphenylcinchoninic acid (tolysin) exercise a general simulating effect in kidney excretion. This action is most marked in the case of uric acid, but it is possible to demonstrate a similar action in the case of urea and chlorides, provided cases are selected with a slightly high blood concentration of these substances.

"Cincophen and tolysin, as well as the salicylates, possess marked analgesic properties * * *. It is well known clinically that without increasing the doses of these drugs their anelgesic effect is gradually lost. Consequently they are generally administered in rather large doses for short periods. Similarly their stimulant action on uric acid excretion is gradually lost with their continued administration.

"As pointed out by Mosenthal and Lewis and others, some cases of chronic diffuse nephritis and hypersensitive cardiovascular disease show a superpermeability of the kidney, i. e., low blood ureas, high phenolsulphonephthalein outputs, etc. These cases of overactivity in mild kidney disease have been attributed to the irritation resulting from inflammatory processes. As the lesion advances the renal parenchyma becomes more severely damaged and then exhibits a subnormal activity to the pathologic stimulus. These findings appear to be analogous in certain respects to the results obtained by the administration of salicylates, cincophen and their derivatives." (C. W. O. B.)

Carr, A. D. **The effect of water diuresis on the elimination of certain urinary constituents.** Jour. Pharm. and Exper. Therap., October, 1921.

"The effect of water diuresis on the elimination of chlorides, creatinine, urea, ammonia, sulphates, phosphates, and carbonates, has been studied in normal-human subjects. The data obtained confirm the findings of Marshall in regard to urea, creatinine, and chlorides. Sulphates are increased in practically all experiments. Ammonia and phosphates are generally increased, but may be unchanged. All of these substances are decreased in percentage. Carbonates (i. e., total carbon dioxide) are increased not only i

absolute but in percentage amount. The hydrogen ion concentration of the urine is decreased during diuresis * * *.

"Marshall has found that with water diuresis 'creatinine is not increased to a measurable extent; urea is increased definitely but not more than two fold; chlorides are apparently increased, but the increase is variable and generally less marked than that of urea.'" (C. W. O. B.)

EYE, EAR, NOSE, AND THROAT.

Roy, J. N. **Diseases of the eye due to syphilis and trypanosomiasis among the negroes of Africa.** Arch. Ophth. Vol. L., No. 1.

A summary of the article shows the following: Among 135 Negro syphilitics examined and studied 16 cases of ocular disease involving most commonly the anterior eye were found, namely, three cases of iritis, 8 cases of iridochoroiditis, 4 cases of parenchymatous keratitis, and but 1 case of fundus disease where the choroid was involved. No condylomata nor gummata of iris or eyelids, no ocular muscle paralyses nor optic neuritis were observed.

In sleeping sickness ocular manifestations are rarely seen among the blacks. Four hundred and eighteen cases of this disease were examined and in three were seen fundus changes which consisted of double edematous papillitis and dilatation of the retinal veins. Two of these cases were in extremis showing marked meningeal involvement which may have contributed to the fundus picture, but the third case cleared up rapidly under treatment and was undoubtedly due to the trypanosome.

The mulatto is as predisposed as the white man to ocular involvement in syphilis and in human trypanosomiasis. (L. H. C.)

Voorhees, I. W. **Lung abscess following tonsillectomy. Report of a case with bronchoscopic and X ray findings.** Laryngoscope, Vol. XXXI, No. 8.

The writer gives a detailed report of a case where a tonsillectomy was done under ether anesthesia given by the mouth hook under pressure. The operation was uneventful, the patient reacted well and convalescence was uninterrupted until about the tenth day when symptoms referable to the right chest were complained of. Lung abscess was suspected and later was verified by X ray. With the aid of the bronchoscope a sloughing mass and considerable pus were removed. From X ray plates taken later it was believed that the abscess had ruptured into the pleural cavity. The case terminated fatally and no necropsy was permitted.

Regarding the causes of abscesses of the lung following tonsillectomy, the author believes that the pressure of the suction pressure

apparatus is insufficient to blow clots of blood or other particles out of the air path. A strong suction effort is exerted during inspiration, especially in spasms of the glottis or falling back of the tongue and in this way particles may be aspirated. These particles may consist of blood clot, pieces of adenoid tissue, cheesy masses expressed from tonsillar crypts, a broken tooth, and rarely pieces of tonsil which have become detached from the main mass in removal.

If the adenoid curette is used particles of adenoid should be watched for. The suction apparatus is of distinct advantage here as often small pieces are found clinging to the metal tube. Cheesy particles should be carefully removed by pressure, curette and suction before starting the tonsillar removal. He further believes that this material is more often responsible for lung infection than any other thing and that the alleged increase of lung abscess is in great part due to the fact that many operators disregard these particles and are more interested in the removal of the tonsil. (L. H. C.)

NOTES AND COMMENTS.

Of all the philosophers of the past not one makes as strong an appeal to the physician as Montaigne and no matter how soon the adult reader is introduced to Montaigne he will always regret not having come earlier under the spell of this rare spirit. Capt. J. S. Taylor, Medical Corps, United States Navy, has written a delightful series of essays on Montaigne and Medicine, which are appearing in the Annals of Medical History. These essays are about to be issued in book form by Mr. Paul B. Hoeber, of New York, and we await the appearance of the volume with pleasant anticipations.

The attention of medical officers of the Pacific Fleet has been directed by the fleet surgeon to the "Report on the Proceedings and the Resolutions of the General Conference Committee" of the "All-American Conference on Venereal Diseases" published in the July 15, 1921, issue (Vol. 36, No. 28) Public Health Reports.

It is not only interesting but of particular value, as dealing with all phases of the subject, to service medical officers who are not only responsible for the proper care of developed cases of one or another of the diseases discussed but are required to employ every legitimate and morally admissible means in the prevention of impaired efficiency and general service damage. In this connection the Government's interests are necessarily of greatest importance and constitute the primary basis of all preventive activity, as far as the Navy is concerned. The individual benefits of course and it is eminently desirable that he should, but such benefit is none the less of the nature of by-product.

In acting to protect the service from avoidable damage by venereal diseases we can be neither jesuitical nor puritanical. In other words, on the one hand, discrimination must be exercised in adopting methods to be employed, and, on the other hand, moral considerations can not be permitted such weight as to make the physical side of any program ineffectual.

The resources at our immediate command include physical and moral aspects of the question.

Undependable as are all measures of physical prophylaxis, short of continence, they still constitute the most reliable and directly applicable. It can not be told how far instruction and advice may

guide the individual—what impression has been made by talks to men in the way of preventing exposure—but there is evidence that in case of exposure the employment of certain recognized measures of prophylaxis reduce the percentage of infection. Probably the most efficient among such measures "is the use of a mechanical device that prevents actual contact," but cleansing and chemical agents if early and properly applied are of demonstrated value. The nearer the prophylactic to the source of infection the better and it is in making practical application of this truism that discrimination must be exercised. In the Navy for peculiar as well as obvious reasons the moral point of view very naturally objects to the dispensing of individual prophylactic packets as a palpable invitation to wrong doing. It is of course the ideal from the purely preventive point of view but, in deferring to moral considerations, effect may still be given to the fact that if chemical prophylaxis is to be of any value it must be applied promptly after exposure. This has been and should be accomplished by prophylactic stations established within liberty areas when these are remote from ships. All this is understood in the service and its acceptance follows presentation.

There is great reason for confidence, however, that as prohibition has an indirect effect in reducing sexual promiscuity by removing easy access to artificial stimulation of the emotions and preventing the impairment of self-command, so "moral prophylaxis" has a direct influence toward continence as a principle of conduct, to say nothing of the opportunity to forward public information and education which it contemplates. Results in this direction are necessarily slow in appreciable degree; they are not evident from day to day, but as with so much that is of large importance in the way of reform effort must be expended by those of to-day that those of to-morrow may prosper. The improvement of future generations is not too remote an objective in this matter to excite interest in the forward-looking individual, but more immediate results are certainly derivable, and it is this that I wish particularly to emphasize.

In their periods of instruction to the men on the subject medical officers must not neglect or slur over its moral aspect. Medical officers are strategically situated in their professional capacity and intimate relationship to the men of the service to make forceful and convincing presentation of all sides of the subject, and the very fact that they deal so authoritatively with the physical side makes these comments on the moral side peculiarly acceptable.

It all depends upon the manner with which it is done and the phraseology selected, whether or not attention is compelled and the lesson driven deep. The obligation implied in this duty to give such talks to the men is worth meeting in thoroughgoing fashion

and the Commander in Chief expects it. A gratifying response from the men is assured to those who discharge this duty interestedly and seriously, but it need not be expected without study and a conscious touch with the psychology of the group addressed.

The reverse of this picture is that of the conditions ashore in the various ports visited, and these are not only admittedly bad normally but there is always an increase of activity in the lower world in anticipation of the arrival of a transient public such as thousands of men represented by the fleet. This is the root of the trouble which is difficult to control but which is being intelligently attacked by the Public Health Service and the field representatives of the Interdepartmental Social Hygiene Board.

They deserve assistance, and one way in which this can be rendered by the fleet in return for their work in its interest is by furnishing the information required in respect to sources of infection. Many reports of this kind reaching the fleet surgeon are not worth the paper written on, either because the data is frankly not reliable or the report is long delayed. No progress can be made in this direction by an air of perfunctoriness in seeking the information, and the men must be made to understand that no information is better than false information; that the information sought is to be used not for punitive purposes but in the interest of the health of the infecting party as well as their own and that of their shipmates.

Benzyl benzoate is an oily liquid with a characteristic but not offensive odor, soluble in alcohol, ether, and fatty oils, insoluble in water. Chemically it is a benzyl ether of benzoic acid. It can be obtained by fractional distillation of balsam of Peru.

It has given good therapeutic results in bronchial asthma, whooping cough (5 to 40 drops of 20 per cent solution according to age), obstinate hiccough, uterine spasm, exaggerated intestinal peristalsis, and angiospasm. Rürah, of Baltimore, has found the remedy useful in many spasmodic affections of children where there is no organic lesion of the central nervous system. The disagreeable taste may be partially disguised by dispensing it in benzaldehyde, in the proportion of 1 to 5, thus actually heightening the effect.

From the British Medical Journal of July 2, 1921, we learn that an expedition has been sent to British Guinea by the London School of Tropical Medicine for the purpose of investigating the best method of controlling filariasis. The leader of the expedition is Prof. R. T. Leiper, director of the helminthology department. "There is evidence that filariasis is a house infection, and examina-

tion of the blood commonly shows that where one or two pronounced cases of the disease are found other members of the household, though apparently healthy, harbor the nematode. Steps have also been taken to make a kind of mosquito census to ascertain the proportion that are infected. It is known that more than one species of mosquito is capable of acting as host, and one of the objects of the expedition is to ascertain how many such species there may be. The microfilariae enter the mosquito's stomach with the blood when it sucks; they rupture the sheath in which they are inclosed, pierce the wall of the stomach and find their way into the muscles of the thorax, where they undergo development and become much larger. From the muscles the embryo passes into the labium, and when the mosquito bites it becomes liberated. It finds its way through the skin perhaps by the mosquito's puncture. The stages by which it reaches the adult condition are not known, but it is when full grown that it produces the chief signs of the disease—lymphangitis, abscess, chyluria, and elephantiasis."

The National Board of Medical Examiners has completed the first five years' work and with it the trial period of its usefulness. The principle which this board has stood for, namely, the establishment of a thorough test of fitness to practice medicine, which might safely be accepted throughout this country and abroad, has been widely accepted. Since this board was organized by Dr. W. L. Rodman, in 1915, 11 examinations have been held. These examinations have been conducted on the plan of holding at one sitting a written, practical, and clinical test for candidates with certain qualifications, namely, a four-year high-school course, two years of college work, including one year of physics, chemistry, and biology, graduation from a Class A medical school, and one year's internship in an acceptable hospital. These examinations have covered all the subjects of the medical school curriculum, and have been conducted by members of the board with members of the profession resident in the place of examination appointed to help them. Such examinations have been held in Washington, Philadelphia, New York City, Boston, Chicago, St. Louis, Rochester (Minn.), and Minneapolis. During the war a combined examination was held at Fort Oglethorpe and Fort Riley. There have been 325 candidates examined, of whom 269 have passed and been granted certificates.

Starting with the indorsement of the Council on Medical Education of the American Medical Association, American Medical College Association, and various sectional medical societies, the recognition of the Army, Navy, and Public Health Service Medical Corps of the United States and certain State boards of medical examiners, the

certificate is now recognized. Also by 20 States, as follows: Alabama, Arizona, Colorado, Delaware, Florida, Georgia, Idaho, Iowa, Kentucky, Maryland, Minnesota, Nebraska, New Hampshire, New Jersey, North Carolina, North Dakota, Pennsylvania, Rhode Island, Vermont, and Virginia, the Conjoint Board of England, the Triple Qualification Board of Scotland, the American College of Surgeons, and the Mayo Foundation of the University of Minnesota.

There has been such a wide-spread demand for an opportunity to secure this certificate by examination, that the board has now adopted and will put into effect at once, the following plan: Part I to consist of a written examination in the six fundamental medical sciences: Anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; bacteriology; materia medica. and pharmacology. Part II to consist of a written examination in the four following subjects: Medicine, including pediatrics, neuropsychiatry, and therapeutics; surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; public health, including hygiene and medical jurisprudence. Part III to consist of a practical examination in each of the following four subjects: Clinical medicine, including medical pathology, applied physiology, clinical chemistry, clinical microscopy and dermatology; clinical surgery, including applied anatomy, surgical pathology, operative surgery, and the surgical specialties of the diseases of the eye, ear, nose and throat; obstetrics and gynecology; public health, including sanitary bacteriology and the communicable diseases.

Parts I and II will be conducted as written examinations in Class A medical schools and Part III will be entirely practical and clinical. In order to facilitate the carrying out of Part III subsidiary boards will be appointed in the following cities: Boston, New York, Philadelphia, Minneapolis, Iowa City, San Francisco, Denver, New Orleans, Baltimore, Galveston, Cleveland, St. Louis, Chicago, Washington, D. C., and Nashville, and these boards will function under the direction of the national board. The fee of $25 for the first part, $25 for the second part, and $50 for the third part will be charged. In order to help the board the Carnegie Foundation has appropriated $100,000 over a period of five years.

At the annual meeting held June 13 of this year in Boston the following officers were elected: M. W. Ireland, Surgeon General U. S. Army, president; J. S. Rodman, M. D., secretary treasurer; E. S. Elwood, managing director.

Mr. Elwood will personally visit all Class A schools during the college year to further explain the examination, etc., to those interested. Further information may be had from the secretary treasurer, Medical Arts Building, Philadelphia.

In the Military Surgeon for September, 1921, two papers written by naval medical officers were published: "Remarks on the Neurology of Syphilis" by Lieut. Commander R. Sheehan, Medical Corps, United States Navy, and "Syphilis and Venereal Disease—A Service Liability" by Lieut. Commander C. S. Stephenson, Medical Corps, United States Navy.

The valuable work which has been accomplished in the last two years in the treatment of leprosy with derivatives of chaulmoogra oil has aroused much interest and speculation as to the applicability of this agent in the treatment of tuberculosis. Dr. Thomas J. Beasley, of Indianapolis, from a comparative study of the two diseases, is led to hope that an agent which will prove curative in one would be applicable to the other. In a short preliminary report in the New York Medical Journal for September 21, 1921, he gives his experiences with the use, in 10 cases, of the ethyl esters of chaulmoogra oil, prepared by the method of Dean. His observations have extended over a period of nearly a year and the results obtained are encouraging.

Dr. John Brown, a Scottish physician, who lived in Edinburgh, where he died May 11, 1882, devoted his leisure hours to literature. In one of his sketches, "Rab and His Friends," a pathetic dog story, he gives a picture of a surgical operation as it was performed in the days of his youth, nearly a hundred years ago. It was an operation for cancer of the breast.

"The operating theater is crowded; much talk and fun, and all the cordiality and stir of youth. The surgeon with his staff of assistants is there. In comes Ailie (the patient); one look at her quiets and abates the eager students. That beautiful old woman is too much for them; they sit down and are dumb, and gaze at her. These rough boys feel the power of her presence. She walks in quickly, but without haste; dressed in her mutch, her neckerchief, her white dimity short gown, her black bombazeen petticoat, showing her white worsted stockings and her carpet shoes. Behind her was James (her husband), with Rab (the dog). James sat down in the distance, and took that huge and noble head between his knees. Rab looked preplexed and dangerous, forever cocking his ear and dropping it as fast.

"Ailie stepped up on a seat, and laid herself on the table, as her friend the surgeon told her; arranged herself; gave a rapid look at James, shut her eyes, rested herself on me, and took my hand. The operation was at once begun; it was necessarily slow; and chloro-

form—one of God's best gifts to his suffering children—was then unknown. The surgeon did his work. The pale face showed its pain, but was still and silent. Rab's soul was working within him; he saw that something strange was going on—blood flowing from his mistress, and she suffering; his ragged ear was up, and importunate; he growled and gave now and then a sharp impatient yelp; he would have liked to have done something to that man. But James had him firm, and gave him a *glower* from time to time, and in intimation of a possible kick—all the better for James, it kept his eye and his mind off Ailie.

"It is over; she is dressed, steps gently and decently down from the table, looks for James, then, turning to the surgeon and the students she curtsies, and in a low, clear voice, begs their pardon if she has behaved ill. The students—all of us—wept like children; the surgeon wrapped her up carefully, and, resting on James and me, Ailie went to her room, Rab following."

Ten days later she was dead, a victim of sepsis.

NURSE CORPS.

INSTRUCTION AT OTEEN.

By E. L. Hehir, Chief Nurse, United States Navy.

A summer school for instruction in tuberculosis nursing was held at the United States Public Health Service Hospital, Oteen, N. C., during the month of September, 1921. This was the first school of its kind to be held by the United States Public Health Service and I think those who were privileged to attend will always find it a source of satisfaction to know that we were the pioneers in this work, although future classes may show more brilliant results. There were 23 nurses in the class; 4 from civilian sanatoria, 2 from the Navy Nurse Corps—Louise H. Clarke, Reserve nurse, United States Navy, and myself—and the remainder of the class were from the United States Public Health Nursing Service.

Miss Alice Stewart, of the Pittsburgh Tuberculosis Association, was in charge of the course of instruction for the nurses. Miss Stewart's daily lectures and talks were always enjoyed and most valuable, as were the general conference meetings, when we asked questions and "talked it over." The nurses at these conferences, coming from the North, South, East, and West, each had something new and of interest to offer.

Miss Mary E. Marshall, of the National Tuberculosis Association, delivered the most interesting lectures about the work and achievement of that association and emphasized the importance of everyone helping in some way to prevent the spread of this disease. In this way only can the disease be overcome.

The class work was divided between theory and practice. The first two hours of the morning, from 7 to 9, were spent on duty in the wards. We attended the lectures for doctors every morning from 9 to 10; these lectures were given by a physician who is a specialist in tuberculosis, and they always proved very profitable. Dr. Hayes, of the United States Public Health Service, lectured to the nurses every morning. His lectures were particularly interesting, especially those on the history of tuberculosis. The demonstrations were sometimes in the morning, but more often in the afternoon.

We always looked forward with keen anticipation to the doctors' general conference in the evening, to which we were invited. Dr.

Barlow, from the United States Public Health Service Hospital, New Haven, Conn., usually lectured, and a lively discussion would follow. A light refreshment was served before going to our quarters.

Many of the nurses were interested in occupational therapy; and the demonstrations in this department were very instructive.

We were taken by automobile to Kenilworth, a general Public Health Service hospital, in which there is a special department for surgical tuberculosis patients, where the sun treatment is used.

A doctor belonging to the United States Public Health Service had charge of the social activities and always had something pleasant planned for the student nurses. Our time off duty was spent in mountain climbing and in trips to interesting places near Asheville.

The following letter from the Surgeon General of the Navy to Miss Clara D. Noyes, director of the department of nursing, American Red Cross, Washington, D. C., was read at the national convention, American Red Cross, Columbus, Ohio, October 6, 1921:

4 October, 1921.

My Dear Miss Noyes: It is a matter of sincere regret to me that the press of public duties prevents an acceptance of your very kind invitation to be present upon the occasion of the reunion of the ex-service nurses in connection with the Red Cross convention. It would have been much more satisfactory to me, and possibly to you, to have had me appear in person and convey a message of appreciation for the splendid work performed by the nurses in the Navy during the late war, and who make up a portion of the membership of your organization. Not being able to speak to the ex-service nurses personally, I have much pleasure in making a few remarks about their performance of duty in the naval organization.

First of all, permit me to say that the Navy, while limited in its power to voice its appreciation in any tangible form, has been, is, and always will be, most appreciative of the hearty response of nurses in civil life to the call for duty by the American Red Cross for service in the Navy. The willingness and keen desire of the nursing profession to bear a part of the burden of war, as shown by the thousands of enrollments for service in the armed forces, emphasized the high spirit of patriotism in those women classed as nurses in the great profession of medicine. One of the most impressive lessons of the late war was the response of the women of our country when the call to arms sounded throughout our land. The principles for which our Nation took up arms aroused in the hearts of our women a willingness to sacrifice their all because the cause was one of righteousness and one of the defense of humanity

against a barbarous enemy. The Red Cross nurse properly symbolizes in the most beautiful fashion the love and affectionate ministration of American motherhood in the care of our Nation's defenders. The services of the nurse for the wounded in hospital, on board ship, or in camp, does not surpass the sacrifices, the hardships, and the accomplishments of the nurse called upon to treat those ravaged by the terrible epidemic of influenza which gripped our populace, civil as well as military, in the autumn of 1918.

While enrollment in the American Red Cross is not a requirement for enrollment in the Navy Nurse Corps, it has been my policy, and I believe that of my predecessor, to urge all Navy nurses to enroll in the American Red Cross nursing service. I desire that our nurses maintain an interest in the American Red Cross nursing service, for that organization should, as the Reserve Nursing Service for the Army and Navy, link up the nursing profession throughout the country.

I need not invite your attention to the great service rendered by the dietitians furnished by the Red Cross. The use of proper diet for many disease conditions is now recognized as a most important factor in successful treatment and the willingness of so many individuals to make personal sacrifices in entering the service as dietitians has been most commendable.

Besides the many naval hospitals which have been turned over for operation by the Veterans' Bureau or the Public Health Service for the care of beneficiaries of the former, the Navy Medical Department is furnishing hospital care and treatment for a great many ex-service men. It is understood that in the near future there will be even greater demands made upon naval hospital facilities for this class of patients. We hope to place 2,000 beds, before long, at the disposal of the Veterans' Bureau. It is realized that the Government services must still depend very largely upon the Red Cross for assistance in enrolling nurses for the care of ex-service men in our hospitals, and I wish to emphasize this aspect of the nursing service and to state that while conditions in civil life may be more attractive, the adequate care of the sick in the Navy, as well as of the ex-service man, calls for the unselfish devotion of the best nursing service that we can command. It is most desirable that this sentiment of devotion be sustained now as it was during the war.

I embrace this occasion to express my appreciation of the interest shown by the Red Cross, through their division directors, in calling to the attention of the nurses of the country the fact that additional nurses are now needed in the Medical Corps of the Navy, and to state that the effort made by the Red Cross has already resulted in an increase of applications and of appointments in the Navy Nurse Corps.

In closing this letter to you I wish to acknowledge a debt which we owe to you, Miss Noyes, personally for your services, as director of the Bureau of Fiéld Nursing Service during the late war. I realize to what extent you were concerned in perfecting the nursing service of the base hospital units, the station units, and the detachments for war service in the Navy, and it gives me great pleasure to express, on behalf of the Navy, its cordial appreciation of your excellent service in connection with the organizations mentioned.

Sincerely yours,

E. R. Stitt,
Surgeon General, U. S. Navy.

DIGEST OF DECISIONS.

DISABILITY RESULTING FROM INJURY RECEIVED OR DISEASE CONTRACTED IN LINE OF DUTY BY A PERSON IN THE NAVAL SERVICE, GENERAL RULES RELATING THERETO.

In an opinion of the Attorney General, rendered August 21, 1918 (32 Op. Atty. Gen., 12), it was held:

"Personal injury or disease shall be deemed to have been suffered or contracted 'in the line of duty' within the meaning of section 300 of the War Risk Insurance Act when the person on whose account compensation is claimed was, at the time the injury was suffered or the disease contracted, in active service in the military or naval forces, whether on active duty, on furlough, leave of absence, or under arrest, unless it appears that the injury or disease has been caused by wilful misconduct on his part or by something done by him in pursuing some private avocation or business and which has intervened as the producing cause between his public service or performance of duty and the injury or disease." (Syllabus.)

The general rule set forth by the Attorney General in this opinion governing the question of line of duty is as follows:

"The mere fact that an injury or disease is coincident in time with service is not sufficient to class it as suffered or contracted 'in the line of duty.' It must have been caused by the presence of its victim in the line of duty when it was received or contracted. But the relation of causation is sufficiently shown when it appears that the victim was at a place and doing what was required or permitted by his duty as a soldier, and that, between his presence and conduct and the injury or disease, no adequate and sufficient cause for which he is responsible intervenes between his service or performance of duty and the injury or disease. He will be responsible for an intervening cause if (1) it consists of his own wilful misconduct or (2) it is something which he is doing in pursuance of some private avocation or business."

3. By way of illustration the Attorney General stated the proposition as follows:

"A soldier in camp may, during a rest hour, be employing his time by working on an invention wholly disconnected with the military service. He is, in general, in the line of duty, but at the moment is exercising a private right for private purposes. An explosion is produced by chemicals which he is using. There has intervened a cause for which he is responsible and the injury is not suffered in the line of duty. But while so employed he is struck by lightning, or becomes ill, or is suddenly stricken with appendicitis, clearly there has been no intervening cause for which he is responsible and the injury is suffered in the line of duty. In either case, what he was doing was in no way inconsistent with the performance of his military duty. While he was doing it the duties of a soldier still rested on him. He was not free from their obligations, nor was he necessarily deprived of the rights which grow out of their performance. This would result only in the event the thing he was doing, outside of his duty, in fact, caused the injury he received."

4. This opinion having come to the attention of the Department, exception was taken to the above ruling and a reconsideration was requested April 2, 1920, presenting several specific cases then pending in the Department involving the question of line of duty. In its request for reconsideration the Department stated:

"There is believed, however, to be no doubt that the question (line of duty) is fundamentally the same regardless of how it may be presented or by what instrumentality it is in the first instance determined, thus making unnecessary the consideration of specific statutes or regulations applicable to the various cases which arise." (File 26250–1491: 1.)

In reply to the above the Attorney General, on June 2, 1920 (file 26250–1491: 1) stated that he had reexamined the question involved in his opinion of August 21, 1919, and after a careful consideration was constrained to adhere to the views then expressed, but stated further that in considering the specific cases submitted by the Department he thought a third general rule should be stated, namely, "something which grows out of relations unconnected with the service or is not the logical incident or provable effect of duty in the service."

5. It will be noted from the above that these two opinions of the Attorney General give a far more liberal interpretation of the former opinion of the Attorney General (7 Op. Atty. Gen. 149), and the case of *Rhodes* v. *United States* (79 Fed. Rep. 740) than has been previously given to these authorities by this Department. It will be observed, however, that these opinions of the Attorney General are not quite as liberal on the question of line of duty as the Court of Claims in the case of *Moore* v. *United States* (48 Ct. Cls. 110); which authorities these opinions purport to adopt. The essential provisions of the opinion of the Attorney General of May 17, 1855 (7 Op. Atty. Gen. 149) are as follows:

"When the statute provides pension for disability or death occasioned by wounds or injuries received, casualty occurring, or disease contracted, in the line of duty, it intends that the performance of duty must have relation of causation or consociation, mediate or immediate, to the wound, the casualty, the injury, or the disease, which produces the disability or death.

"To determine the right of pension the question is not whether, when the cause of disability or death occurred, the party was on duty or not, in active service, or on furlough or leave, in arrest or not, but whether, in any of the possible conditions of service, the cause of disability or death was appurtenant to, dependent upon, or connected with, acts within, or acts without, the line of duty.

"Upon the question of casualty, the opinions of experts are evidence, but they do not constitute either exclusive or conclusive proof; and the question is to be judged by the real facts like any other matter of evidence.

"Where the proofs as to the question of actor and subject are balanced, and it is impossible to determine by them whether the case be one of contemporaneity or collocation only, or of cause and consequence, it is a reasonable inference of public policy to presume in favor of the service.

"It is according to public policy to presume in favor of the service, where the line of duty enters potentially into the causes of disability or death, although it be not certainly provable that it was the exclusive or predominant cause." (Syllabus.)

The essential provision in the opinion of the Circuit Court in the case of *Rhodes* v. *United States* is as follows:

"Nor was there any error in the definition which the court gave to the jury of a 'disease contracted in the line of duty' when he declared that 'the service must have been the cause of the disease and not merely coincident with it i

time.' This is the patent and natural meaning of the language of the statute. It places the service and the discharge of duty in the relation of causes to the injuries and diseases that warrant the grant of pensions. It allows a pension for wounds or injuries received and for diseases contracted in the service and in the line of duty. No one would seriously contend that every wound, injury, or disease received or contracted during the term of service is pensionable under this law. A wound or injury inflicted upon himself by a soldier, or received by him while hunting wild animals, or squabbling with his comrades for his own amusement, or while doing any other act not in the line of his duty, would form no basis for a pension. The reason is that it would not be caused by his presence in the line of duty. The same rule applies to wounds, injuries, and diseases; for in the law they stand together in a single class. The result is that neither injury nor disease can authorize the grant of a pension under the acts of Congress unless it is caused by the presence of its victim in the line of duty when it was received or contracted."

The essential provisions in the case of Moore *v.* United States are as follows:

"A soldier is 'in line of duty' until separated from the service by death or discharge, if during such period he is submitting to all of its laws and regulations; and he is 'in line of duty' while on leave of absence. But the wounds or disease must not be the result of his own misconduct." (Syllabus.)

"In this case, or in any claim under this statute, is the court to take and consider evidence as to when the disease of which the soldier died was contracted? In this age of the discovery and dispute as to disease microbes and germs, is the court called upon to take evidence and decide when the germs of typhoid fever, tuberculosis, or other diseases first began to incubate? If so, then the evidence might show that a soldier engaged in active war duty for years, and in the midst of which he died of tuberculosis, contracted the disease before he entered the service.

"We do not believe that any such narrow construction of this statute is demanded. We think that a reasonable construction of it confers the benefit whenever the soldier dies while in the service generally, and submitting to its rules and regulations, from wounds or disease not the result of his own misconduct."

It was further held by this department in the case of an individual who had contracted a disease prior to his entry in the service and clearly not in the line of duty, and died by reason of medical treatment received in line of duty, that—

"It was held that since the patient's death was the direct and immediate result of the treatment administered to him by proper medical authority, that the death of the deceased occurred in line of duty. It is immaterial that the disease for which he was being treated was contracted not in line of duty and was acquired as a result of his own misconduct, the fact being established that death was not the result of the disease but of the medical treatment for the disease." (File 26543–213, J. A. G., 29 April, 1918.) (C. M. O. 37, 1918, 23.)

In view of the foregoing, I am of the opinion that a member of the naval service who, between the date of his entry into the service and the date of his discharge, suffers injury or contracts disease resulting in disability, is in line of duty unless such injury or disease is caused by (1) his own wilful misconduct, or (2) some act or course of conduct of his disconnected with his military duty. Further that if such person is suffering from a disease not construed as in line of duty and there intervenes a cause, such as medical treatment in line of duty, which brings about his death or results in permanent disability, that disability should be held to have occurred in line of duty.

A further question presented in cases coming before the department concerns whether or not certain diseases contracted within a given period by a person in the naval service after he had entered therein should be considered as having been contracted prior to his admission into the service and therefore not in line of duty, and subsequent thereto and in line of duty. This office has heretofore consistently held that no general rule can be established to govern cases of this character, but that each must be decided upon the law and the facts applicable thereto; that is, if the facts appearing on the record in the case or the facts obtained from a properly authenticated medical history thereof, such as records of creditable institutions or the statement of the physician attending at the time of the origin of the disability complained of, show that it existed prior to the admission of such individual into the naval service it should be held to have occurred prior thereto and not in line of duty. On the other hand, if the only information available to establish the fact that the disability occurred prior to his admission into the naval service is a presumption either arising from the nature of the disease or mere speculation, it should be held to have occurred in line of duty, providing the same conditions are present as would otherwise warrant a holding of line of duty.

An individual in the naval service found to be suffering from an injury or disability should be considered to stand in a more favorable position relative to line of duty if he was in fact duly examined by the proper naval medical officer or officers at the time of his admission into the naval service. The further fact that such an individual has been in the naval service for a considerable length of time before the disability complained of had rendered him incapable of performing all of his duties should be conclusive in practically all cases that the disability had been incurred in line of duty unless it can be shown that the disability complained of was due to his own wilful misconduct or some act or course of conduct of his disconnected with his military duties.

As a general proposition where it can be shown that the disability complained of is a recurrence, I am of the opinion that he should not be given the benefits of a finding of line of duty, but if the original disability of which the one in question is presumed to be a recurrence in fact happened many years prior to his admission into the naval service, or if in fact he has served a sufficient number of years to raise a reasonable presumption of recovery from the original disability, a holding of line of duty would be warranted.

The following are a few illustrations which the Attorney General has given for the purpose of pointing out the manner in which the general rules laid down by him should be applied:

(1) A yeoman (female) in the U. S. Naval Reserve Force was killed by her husband upon returning to her home after the completion of her duty for the day. The facts deduced show that her death resulted from jealousy on the part of the husband. In other words, it grew out of the domestic relations of this woman entirely separate and distinct from her relations to the Government or the service. It was accordingly held not to be line of duty.

(2) A yeoman in the U. S. Navy on duty at our naval headquarters in London was killed by a motor bus in the vicinity of said headquarters about 3 hours after he had completed his duties for the day. In this case his death was held to have occurred in line of duty for the reason that after the day's work was done he was not required to remain in any particular place, and it was contemplated of course that during his period of rest it would be necessary for him to pass through the streets of London; such an incident being the logical result of his services under the circumstances.

(3) An electrician in the U. S. Naval Reserve Force on duty at Boston, Mass., was granted liberty on Saturday until the following Monday. On returning to Boston on the following Sunday afternoon in an automobile for the purpose of reporting at his station and duty the following morning, he met death in consequence of an automobile accident. This was held to be line of duty, the Attorney General stating his conclusions as follows: "An ordinary furlough or short leave of absence, however, is a part of the disciplinary regulations of the military service, and the furloughed soldier is still, generally speaking, employed in the active service, and I am convinced, in the line of duty, so long as he complies with the regulations and with the terms of his furlough. Such a furlough, of course, contemplates traveling by the ordinary means, and such accidents as are liable to happen to one so traveling, are logically incidents of the service."

(4) An enlisted man on authorized leave of absence at Brest, France, was injured while en route to Paris by the accidental discharge of a pistol in the hands of a soldier riding beside him on the train. This injury was held to have been incurred in line of duty for the reason that the accident occurred to this man while on leave without his fault and in the same manner as any other passenger might have been injured.

(5) An officer of the Naval Reserve Force while on leave of absence attempted to assist a woman in distress and was injured by a pistol shot. This injury was held not to have been received in line of duty because it resulted from a cause intervening between his service and the accident.

In view of the foregoing, I am of the opinion that the question of line of duty is primarily a question of law and fact which should in each instance be decided by the office of the Judge Advocate General, which office is charged under the law and regulations with the decision of all questions of law relating to the naval service. (File 7657–390:40 J. A. G. 20 May 1921.)

THEODORE ROOSEVELT,
Acting Secretary of the Navy.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.
Lieutenant J. C. Kenning, Medical Corps, United States Navy.

"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all."

LIFE AND TIMES OF AMBROISE PARÉ, WITH A NEW TRANSLATION OF HIS APOLOGY AND AN ACCOUNT OF HIS JOURNEYS IN DIVERS PLACES by *Francis R. Packard, M. D.* Paul B. Hoeber, New York, 1921.

If students of the history of medicine can hardly concede to this work the same abounding praise earned by the author in his "History of Medicine in the United States" it is only because Paré has been written about again and again whereas a systematic review of the history of medicine in the United States was an untried labor before Dr. Packard accomplished it with such conspicuous ability.

But to say that is only to appreciate the writer's other book the more and not to depreciate the one under discussion.

The first observation we have to make in recommending this most instructive and entertaining volume is suggested by the dedication to the author's wife as the inspirer of his fondness for French history. The book is more than a life of Paré. It gives a picture of the dramatic period in which Paré lived and abounds in delightful historical notes on the great personnages referred to. Numerous illustrations help one to picture the people and the times. To lovers of

Paris the most interesting and unusual of these is Nicolay's map of the city at the very beginning of the 17th century. Alas that only some three score of the streets are indicated by name.

Following the spirited and graphic story of Paré's life comes the translation of Paré's reply to his enemies and critics, filling somewhat more than half the volume. The version is very well done indeed.

Contrary to what is common in American publications great care has been taken in this handsome volume to spell and accent correctly the foreign names occurring in the text. Only two or three minor errors have crept in—a remarkable record. Our carelessness and indifference in respect to foreign names and foreign words is not confined to the hurried and harried typesetters of the daily press. (J. S. T.)

THE MANAGEMENT OF MEN, by *Edward L. Munson, Colonel, Medical Corps, United States Army.* Henry Holt and Co., New York, 1921.

To the naval medical officer, this is one of the most valuable books for collateral reading that has appeared as an outgrowth of the war. The author in his preface tells us that the management of men and the development of morale are so inseparably associated that they are properly to be considered together. Each has heretofore been regarded as an art, in the application of which success by the individual largely depended on the relative degree in which the latter possessed inherent qualities of leadership.

The purpose of this book is to show that they should also be considered as a science, whereby mental state and human behavior can be comprehensively and effectually controlled by the scientific application of the fundamental laws governing human nature itself.

The volume requires and deserves careful study on the part of the reader, and any individual who is concerned with the management of men either in the military service or in industrial life will find in it food for thought, and assistance in solving personnel problems which arise from time to time in any organization.

The book begins with a discussion of the meaning of *morale*, a word which has come into popular use since the war. The word is not easy to define fully in the English language; but it is a term which should be used to express the measure of determination to succeed in the purpose for which the individual is trained, or for which a group exists. The author tells us that the word "morale" describes the nature and degree of cooperation, confidence, and unity of understanding, sympathy, and purpose existing between individuals composing the group. It is fitness of mind for the purpose in hand, a sense of solidarity of strength and purpose, and ability to submerge

one's self in the accomplishment of a common cause. It rises and falls from causes which intelligent analysis can usually detect, and which, when once detected, are usually capable of being corrected. Morale is to the mind what "condition" is to the body. It is not merely enthusiasm nor mental courage nor the fighting spirit. It is that mental training and mental hardening which in a body of troops or in a commercial organization continue to function after everything else has broken. It is not only the "will to win" but it is the refusal to consider anything else possible. Morale may be considered a state of faith. It is belief in ability to see anything through to a successful conclusion. It is a measure of a man's confidence in himself, his leaders, and his cause. Morale means not only fighting power, but staying power and strength of mind which resists the mental infections of fear, discouragement, and exaggeration of difficulties and which furnishes the mental stimulus that brings troops back to endure further punishment in the determination to win.

Confidence in leaders, in industry as well as the military service, is based primarily upon the strong personality of the leaders themselves. Their presence must quicken morale. The ingredients of this personality must include ability, devotion, and justice. Confidence in a cause rests upon a conviction that it is right and worth working for or defending. Much of morale work depends on education. The soldier will not fight best and the employee will not work best for a cause of which he knows little or in which he does not fully believe. Morale means conviction, and the conviction to be desired is one which is produced by knowledge of the purpose of the individual's efforts; of good to be reached by the evil to be averted, or both. Morale means teamwork. Individualism must be cheerfully merged in the common end. The key-note of morale work is to have each individual "do it with a smile." This especially means when things are going badly—anyone can smile when they are going well. It is the gospel of cheerfulness in adversity.

The usual military standard of welfare is that of the old idea of "the greatest good for the greatest number." But morale work goes further than this in its methods by endeavoring to secure the greatest good for everyone. Such consideration for the individual interests of subordinates entails a little more time than if such matters receive no official attention. But it pays tremendous dividends in efficiency. Even if conditions are such that personal difficulties can not be fully remedied, the sympathetic interest shown in their welfare is more than appreciated by the men and tends to offset the results of physical fault. Officers who practice such methods have their men enthusiastically behind them. The efficiency born of good will is far greater than that of half-hearted or grudging obedience. All great leaders of men have had a profound knowledge of the human soul. An

understanding of men is quite as important as all of the theoretical knowledge of other branches of military science which the student can acquire.

In 20 intensely interesting chapters, Col. Munson takes up step by step the subject of the management of men and the systematic development of morale and the control of human behavior, and he has produced a volume which sets forth for the first time the forces which can and should be scientifically controlled and systematically directed to the achievement of high morale.

Speaking of morale work, he tells us that it is a study of human nature and the human forces which determine the problems of efficiency. It is neither theoretical nor sentimental. Its purpose is wholly practical and for the attaining of better results. Its aim is to get more and better work out of each individual through his willing cooperation and to produce as nearly as possible uniform results for good. Aside from any other considerations, a basic reason why measures for morale should be carried out is the cold-blooded one that "it pays." If it can do this and at the same time contribute to the advantage of the individual, so much the better. Men are not inanimate cogs in a machine driven by an outside force, but living units that respond to command only to the extent that willingness has been generated within them. Morale work then, in its essence, is the science of human engineering, which when applied to the Army or Navy makes each living component of the military machine function in higher efficiency and better coordination. (W. M. K.)

History of Medicine by *Fielding H. Garrison, A. B., M. D., Lieut. Colonel, Medical Corps, United States Army.* Third Edition. W. B. Saunders Co., Philadelphia, Pa., 1921.

The issue of a third edition of this work reflects credit on the judgment of the portion of the professional public that reads books and proves the steady growth in America of interest in a subject long neglected here, whereas in the Old World the brightest minds have always turned to it for instruction as well as for entertainment.

The attitude of the average American medical man to the study of medical history grows largely out of the erroneous conception that its pursuit is simply for recreation and contributes nothing to professional excellence or pecuniary returns. It is not pertinent here to discuss this fallacy; but if a doctor will study Col. Garrison's book he will be convinced that, as in industry the first step in patenting a new idea is to ascertain what has already been done in that domain, so a knowledge of earlier medicine is time-saving, enlightening, remunerative for those working for the progress of modern medical science.

Through his long connection with the vast mine of information available in the Surgeon General's library at Washington, Col. Garrison enjoyed unrivaled facilities for the task of compiling a history of medicine, but he has done something infinitely greater than compile. Profound scholarship, exquisite literary taste, an incredibly wide range of information have qualified the author to produce a work unique in American literature, a monument not only to the genius of the past but to his own remarkable industry and varied talents.

Every physician should have this book on his desk and, better still, at his bedside and use it as a sweetener of his night thoughts, the larder whence he can get a digestible *bonne bouche* on which to sleep after the labors and annoys of the day, not attempting to read it through at a few sittings but enjoying it bit by bit—*nulla dies sine linea.*

Garrison's history is a treasure house of useful knowledge. The fine print contains the succinct data for which one turns in a hurry when a name or a year has escaped the memory. The main text, and especially the résumés at the end of each chapter, giving the cultural aspects of the period, open up broad avenues of thought and inspiration. The narrative of the slow development of medical thought is embroidered with references to art and general literature and runs parallel with the story of civilization's evolution. Written in the spirit of Buckle and other philosophic historians the book furnishes us not so much with daily incidents and the details of birth and death as with the compelling motive, the sources of inspiration, the methods by which our professional forbears blazed the hard road from darkness to light.

The volume is peculiarly American in its common sense, its avoidance of pedanticism, its just assignment of values. It is un-American in its meticulous historical accuracy and its recognition of our debt to antiquity.

In this latest edition no modification and but few additions have been necessary. It is gratifying to note references to the United States Naval Medical Bulletin as helping in some small measure to stimulate an interest in medical history.

We recommend Garrison's "History of Medicine" to American medical men as the only complete and up-to-date review of the subject in the English language. (J. S. T.)

Medical Electricity and Roentgen Rays, by *Sinclair Tousey, A. M., M. D., consulting surgeon to St. Bartholomew's Clinic, New York City.* Third Edition. W. B. Saunders Company, Philadelphia, Pa., 1921.

The application of electricity for medical purposes is making such rapid encroachments on the field of therapeutics that, as the author

says in his preface, it is impossible for any book on electricity to be up to date. Since the last edition of this volume the most important advances have been made in dental and gastro-intestinal radiography and in the standardization of apparatus and technic and, in the edition recently published, the writer has made an earnest endeavor to give his readers the last word concerning these advances. The book contains much valuable information about the application of electricity in its numerous forms to diagnosis and treatment, making the volume an excellent book of reference. (J. C. K.)

For our hours of recreation two late books are offered:

The Master of Man, by *Hall Caine*. J. B. Lippincott Company, Philadelphia, Pa., and The Cradle of the Deep, by *Sir Frederick Treves, Bart. G. C. V. O., C. B., LL. D.*, E. P. Dutton & Company, New York.

Eight years have passed since we have had a book from the pen of Hall Caine. The war brought him other duties, but the signing of the armistice left him free to write and he has now given us the Master of Man, a tale of the Isle of Man, that quaint bit of land in the Irish Sea, the scene upon which so many of his novels are laid.

It is a story of the universal struggle of the human soul with sin and he has thought of it in the light of its terrible motto: "Be sure your sin will find you out." Time has no power to cancel sin, and the sea is not deep enough to conceal it. A man may put his secret sin behind him and build up a new life, yet some day, out of a blue sky, the bolt will fall. In the story a young advocate sins with a woman and then forgets. But nature never forgets, and when he becomes a judge the first case he has to try is that of his fellow-sinner who, under fearful temptation, has killed his own child. A great conflict between his duty as a public official and his private interests arises and tries his soul. He goes from sin to sin justifying his conduct at every step, persuading himself that nothing else could be, is brought up in the end by the certainty that by his crime he has disturbed the very foundations of law and order in his little community, and at last he becomes guilty of crime in the worst of all crimes to him, the betrayal of justice—and his sin found him out.

The subject of this novel has had a great fascination for some able writers. Scott wrote of it in *The Heart of Midlothian*, Hawthorne in *The Scarlet Letter*, Stevenson in *Weir of Hermiston*, and Tolstoy in *Resurrection*. Hall Caine handles it with the art of a master and has told a tale so fascinating that we put the book aside when bedtime comes with difficulty.

Toward the end of a busy surgical career in London, Sir Frederick Treves for recreation took to journeying about the world. He went once to Africa and gained material for a charming volume *Uganda for a Holiday*. On another occasion he journeyed around the world

and gave us a delightful description of portions of India, China, and Japan in his *On the Other Side of the Lantern*. But the book by which he will be best remembered in the years to come is *The Cradle of the Deep*, an account of a voyage to the West Indies recently published in America by E. P. Dutton & Co.

Many of us are familiar with the delightful islands which lie in the sparkling waters of the Caribbean Sea, but not with the array of historic incidents which Sir Frederick, with a rare humor, connects with the ports which he visited.

In these fair islands, in years gone by, under the steaming sun of the Tropics the pirate harried the sea and here in blood, smoke, and cutlass hacks his tale was written. In coves among the islands he careened his ship and hid his treasure, in blue sea alleys he watched for Spanish merchantmen, and in fever-stricken jungles he rotted and died.

From some three centuries after the coming of Columbus the coasts the great navigator tracked out were the scene of a sea life whose common round was one of ever desperate adventure. For three centuries ships poured westward from nearly every port in Europe laden with arms and men, searching for strange riches and for a sight of the marvels of the new earth.

As Sir Frederick tells us in the preface, "Through the island channels lay the passage to El Dorado, to Manoa, the city of the lake, where the streets were paved with gold, and down these seaways, radiant with hope, sailed Raleigh, the dreamer, on his road to fortune.

"It was among these islands and along the main that there came to Drake the strength and craft that crushed, in fulness of time, the Spanish Armada. Here was served the apprenticeship of Dampier, of Frobisher, of Hawkins, and of a host of mighty sailormen who have made the ocean memorable.

"It was to the West Indies that Nelson took his first voyage, a voyage from which the puny lad 'returned a practical seaman.' It was here that he held his first command. It was here that he learnt from the quarter-deck of his little brig the elements of war.

"In the seclusion of these gorgeous islands, indeed, the long sea story of England was begun. The West Indies became the nursery of the British Navy, the school where the thews were hardened and the sea lessons learned. Here was fostered and fed that soul of adventure and reckless daring which inspired the early colonist and made invincible the man with the boarding pike. Here grew from puny beginnings the germ of the great Sea Power of the World."

(W. M. K.)

QUERIES.

Medical officers are invited to submit queries and to present their problems to the BULLETIN, *which, being in a position to draw on varied and extensive sources of information such as are not available elsewhere, will use every means of securing authoritative opinion.*

All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

TO THE EDITOR: Kindly let me know what is the consensus of opinion regarding the toxic effects of picric acid as commonly employed in the treatment of burns. AMBRINE.

In formulating a reply to this query all available reference works have been consulted and a thorough search instituted of current literature that has covered all reports on the use and effects of picric acid that have been listed in the Index Medicus since 1914.

1. The main facts learned regarding the toxicity of picric acid are as follows:

a. There is not recorded a single case in which it was positively demonstrated that poisoning followed the use of picric acid solutions externally.

b. The liver, kidneys, and blood are apparently affected little or not at all by picric acid. After ingestion of the drug, the urine ordinarily contains neither bile, albumen, casts, blood, nor derivatives of hemoglobin. Symptoms such as discoloration of the skin, conjunctivæ, and urine are due to the presence of apparently harmless pigments—urochrome, picrates, and picramates—and therefore are not indicative of damage to any of the organs or fluids of the body.

c. When serious symptoms attributable to picric acid develop, they are gastrointestinal in character, being, it is thought, due to a local irritant action comparable to the occasional dermatitis resulting from its use in surgery.

d. The toxic dose is large. For a man of 150 pounds the fatal dose of the drug administered intravenously is, as determined on dogs, 15 grams, and, as determined on rabbits, 18 grams. As much as 25 grams have been ingested in one dose with no ill effects, and in another instance 25.2 grams produced only gastrointestinal irritation. Other cases are recorded in which the ingestion of 10 to 15 grams resulted in no injury.

e. As to the manner in which absorption takes place, or can take place, from watery solutions applied to the skin and on dressings, no observations are recorded.

It has been demonstrated repeatedly that no substance penetrates the unbroken skin in any appreciable quantity, and this certainly applies to a nonvolatile, crystalline substance in watery solution In connection with studies on skin disinfection it has been shown that even in 5 per cent alcoholic solution picric acid never penetrates beyond the epidermis.

When applied to exposed tissues, as in third-degree burns, picric acid coagulates tissues, superficially but intensely and rapidly, so that they are sealed, and thus the body is protected against absorption of the drug.

Its volatility is so low, fusion and sublimation taking place at 252° F., that no appreciable absorption can result from inhalation of the volatilized drug. In this respect no analogy holds as regards the inhalation of iodin and mercury applied to the skin.

It would seem that the only way in which absorption in any appreciable amount can take place is by inhalation of picric dust from the skin and from dressings that have become dry.

f. It is believed that very rarely does the amount of picric-acid solution used on an individual exceed 1,000 cubic centimeters, equivalent to about 10 grams of the dry acid. Even if the whole of this amount were ingested in one dose, it is at least doubtful if serious symptoms would ensue; and it is certain that of the 10 grams on the skin and dressings only a very small portion can reach the pharynx and lungs as dust.

g. It is possible that picric acid on the skin may, directly or indirectly and in some way of which at present we have no definite knowledge, exert some specific action in cases of burn; but at present this possibility must be regarded as purely speculative.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. Jones, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

CONTROL OF COMMUNICABLE DISEASES.

Inasmuch as the bureau has received many requests for former numbers of the "Notes on Preventive Medicine" containing reprints from the committee of the American Public Health Association on standardization of regulations for the control of communicable diseases, and since it has been suggested by several medical officers that all of these reports be printed in one number of the Bulletin, it is considered expedient to incorporate the full report of the above-mentioned committee in the first issue of the new monthly bulletin. The chief of the bureau of Medicine and Surgery considers that the methods outlined below, with such modifications as are made in italics, are by far the best means of controlling the various communicable diseases, and directs that all medical officers adhere to these regulations in so far as possible.

The following definitions of terms adopted by the committee are reprinted in order that the nomenclature used throughout this article may be more intelligible:

1. *Carrier.*—A person who, without symptoms of a communicable disease, harbors and disseminates the specific microorganisms.

2. *Cleaning.*—This term signifies the removal by scrubbing and washing of organic matter on which and in which bacteria may find favorable conditions for prolonging life and virulence; also the removal by the same means of bacteria adherent to surfaces.

3. *Contact.*—A "contact" is any person or animal known to have been sufficiently near to an infected person or animal to have been exposed to transfer of infectious material directly or by articles freshly soiled with such material.

4. *Delousing.*—By delousing is meant the process by which a person and his personal apparel are treated, so that neither the adults nor the eggs of *Pediculus corporis* or *Pediculus capitis* survive.

5. *Disinfection.*—By this is meant the destroying of the vitality of pathogenic microorganisms by chemical or physical means.

When the word *concurrent* is used as qualifying disinfection, it indicates the application of disinfection immediately after the discharge from the body of an infected person of infectious material or the soiling of articles with such infectious discharges.

When the word *terminal* is used as qualifying disinfection, it indicates the process of rendering the personal clothing and immediate physical environment of the patient free from the possibility of conveying the infection to others at the time when the patient is no longer a source of infection.

6. *Education in personal cleanliness.*—By this phrase it is intended to include all the various means available to impress upon all members of the community, young and old, and especially when communicable disease is prevalent or during epidemics, by spoken and printed word, and by illustration and suggestion, the necessity of:

(1) Washing the body daily with soap and water.

(2) Washing hands in soap and water after voiding bowels or bladder and always before eating.

(3) Keeping hands and unclean articles, or articles which have been used for toilet purposes by others, away from mouth, nose, eyes, ears, and vagina.

(4) Avoiding the use of common or unclean eating, drinking, or toilet articles of any kind, such as towels, handkerchiefs, hair brushes, drinking cups, pipes, etc.

(5) Avoiding direct exposure to the spray from the noses and mouths of people who cough or sneeze, or laugh and talk loudly, with wide-open mouth, or in explosive manner.

7. *Fumigation.*—By fumigation is meant a process by which the destruction of insects, as mosquitoes and body lice, and animals, as rats, is accomplished by the employment of gaseous agents.

8. *Isolation.*[1]—By isolation is meant the separating of persons suffering from a communicable disease, or carriers of the infecting organism, from other persons, in such places and under such conditions as will prevent the direct or indirect conveyance of the infectious agent to susceptible persons.

9. *Quarantine.*[1]—By quarantine is meant the limitation of freedom of movement of persons or animals who have been exposed to com

[1] In view of the various ambiguous and inaccurate uses to which the words isolatio and quarantine are not infrequently put, it has seemed best to adopt arbitrarily th word isolation as describing the limitation put upon the movements of the known sic or "carrier" individual or animal, and the word quarantine the limitations put upo exposed or "contact" individuals or persons.

municable disease for a period of time equal to the incubation period of the disease to which they have been exposed.

10. *Renovation.*—By renovation is meant, in addition to cleansing, such treatment of the walls, floors, and ceilings of rooms or houses as may be necessary to place the premises in a satisfactory sanitary condition.

11. *Report of a disease.*—By report of a disease is meant the notification to the health authorities, and, in the case of communicable disease in animals, also to the respective departments of agriculture who have immediate jurisdiction, that a case of communicable disease exists in a specified person or animal at a given address.

12. *Susceptibles.*—A susceptible is a person or animal who is not known to have become immune to the particular communicable disease in question by natural or artificial process.

ACUTE INFECTIOUS CONJUNCTIVITIS.

(NOT INCLUDING TRACHOMA.)

(This title to replace the terms gonorrheal ophthalmia, ophthalmia neonatorum, and babies' sore eyes.)

1. *Infectious agent:* The gonococcus or some member of a group of pyogenic organisms, including the hemaglobinophilic bacilli.
2. *Source of infection:* Discharges from conjunctivae, or adnexa, or genital mucous membranes of infected persons.
3. *Modes of transmission:* Contact with an infected person or with articles freshly soiled with discharges of such person.
4. *Incubation period:* Irregular, but usually 36 to 48 hours.
5. *Period of communicability:* During the course of the disease and until the discharges from the infected mucous membranes have ceased.
6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed where possible by bacteriological examination.
2. Isolation—None, provided the patient is under adequate medical supervision. (*In the Navy, restriction of liberty.*)
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Disinfection of conjunctival discharges and articles soiled therewith.
6. Terminal disinfection—Thorough cleansing.

6. *Methods of control*—Continued.
   (B) General measures—
      1. Enforcement of regulations forbidding the use of common towels and toilet articles. Education as to personal cleanliness.
      2. Use of silver nitrate or some similar solution in the eyes of the new born.

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ACTINOMYCOSIS.

1. *Infective agent: Actinomyces bovis.*
2. *Source of infection:* The nasal and bowel discharges and the infected material from lesions in human and animal cases of the disease. Uncooked meat from infected animals may serve as a source of infection.
3. *Mode of transmission:* By contact with the discharges or with articles freshly soiled with the discharges from animal or human cases.
4. *Incubation period:* Unknown.
5. *Period of communicability:* As long as open lesions remain, as proved by the presence of the infective agent or microscopic or cultural tests.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by microscopic examination of discharges from the lesions.
      2. Isolation—None, provided the patient is under adequate medical supervision.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Of discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—By thorough cleaning.
   (B) General measures—
      1. Inspection of meat, with condemnation of carcasses, or infected parts of carcasses, of infected animals.
      2. Destruction of known animal sources of infection.

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ANCHYLOSTOMIASIS.

(HOOKWORM.)

1. *Infectious agent:* Anchylostoma (Necator americanus).
2. *Source of infection:* Feces of infested persons. Infection generally takes place through the skin, occasionally by the mouth.

3. *Mode of transmission:* The larval forms pierce the skin, usually of the foot, and passing through the lymphatics to the vena cava and the right heart, thence in the blood stream to the lungs. they pierce the capillary walls and pass into the alveoli. Then they pass up the bronchi and trachea to the throat, whence they are swallowed and finally lodge in the small intestine. Also by drinking water containing larvæ, by eating soiled food, by hand to mouth transmission of the eggs or larvæ from objects soiled with infected discharges.

4. *Incubation period:* Seven to ten weeks.

5. *Period of communicability:* As long as the parasite or its ova are found in the bowel discharges of an infected individual. Contaminated soil remains infective for five months in the absence of freezing.

6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Microscopic examination of bowel discharges.
2. Isolation.—None.
3. Immunization.—None.
4. Quarantine.—None.
5. Concurrent disinfection.—Sanitary disposal of bowel discharges.
6. Terminal disinfection.—None.
7. Treatment.—Appropriate treatment of infected individual to rid the intestinal canal of the parasite and its ova.
8. Examination of all men recruited from the Southern States and the Philippines.

(B) General measures—

1. Education as to dangers of soil pollution.
2. Prevention of soil pollution by installation of sanitary disposal systems for human discharges.
3. Personal prophylaxis by cleanliness and the wearing of shoes.

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ANTHRAX.

1. *Infectious agent: Bacillus anthracis.*

2. *Source of infection:* Hair, hides, flesh, and feces of infected animals.

3. *Mode of transmission:* Inoculation as by accidental wound or scratch, inhalation of spores of the infectious agent, and ingestion of insufficiently cooked infected meat.

4. *Incubation period:* Within seven days.

5. *Period of communicability:* During the febrile stage of the disease and until lesions have ceased discharging. Infected hair and hides of infected animals may communicate the disease for many months after slaughter of the animal, and after curing of hide, fur, or hair, unless disinfected.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
      2. Isolation of the infected individual until the lesions have healed.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of the discharges from lesions and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning.
   (B) General measures—
      1. Animals ill with a disease presumably anthrax should be placed immediately in the care of a veterinary surgeon. Proved animal cases of the disease should be killed promptly and the carcasses destroyed, preferably by fire.
      2. Isolation of all animals affected with the disease.
      3. Immunization of exposed animals under direction of Federal or State department of agriculture.
      4. Post-mortem examinations should be made only by a veterinary surgeon or in the presence of one.
      5. Milk from an infected animal should not be used during the febrile period.
      6. Control and disinfection of effluents and trade wastes and of areas of land polluted by such effluents and wastes from factories or premises, where spore-infected hides or other infected hide and hair products are known to have been worked up into manufactured articles.
      7. A physician should be constantly employed by every company handling raw hides, or such companies should operate under the direct supervision of a medical representative of the health department.
      8. Every employee handling raw hides, hair, or bristles who has an abrasion of the skin should immediately report to a physician.
      9. Special instruction should be given to all employees handling raw hides in regard to the necessity of personal cleanliness.

. *Methods of control*—Continued.

(B) General measures—Continued.

10. Tanneries and woolen mills should be provided with proper ventilating apparatus so that dust can be promptly removed.

11. Disinfection, before they are used or assorted, of hair, wool, and bristles of animals originating in known infected centers.

12. The sale of hides from an animal infected with anthrax should be prohibited. A violation of this regulation should be immediately reported to the State commissioner of agriculture, by telegram, stating the time, place, and purchaser to whom the hide was sold. The report should also be sent to the person purchasing the hide. Carcasses should be disposed of under the State department of agriculture. The inspection and disinfection of imported hides are under the supervision of the United States Bureau of Animal Industry. In the event that infection is introduced the State agricultural authorities have jurisdiction over infected animals and the local or State health authorities have jurisdiction over infected persons.

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CEREBROSPINAL MENINGITIS.

. *Infective agent: Diplococcus intracellularis* (the meningococcus).

. *Source of infection:* Discharges from the nose and mouth of infected persons. Clinically recovered cases, and healthy persons who have never had the disease but have been in contact with cases of the disease or other carriers, act as carriers and are commonly found, especially during epidemics. Such healthy carriers are not uncommonly found independent of epidemic prevalence of the disease.

. *Mode of transmission:* By direct contact with infected persons and carriers, and indirectly by contact with articles freshly soiled with the nasal and mouth discharges of such persons.

. *Incubation period:* Two or ten days, commonly seven. Occasionally for longer periods when a person is a carrier for a time before developing the disease.

Period of communicability: During the clinical course of the disease and until the specific organism is no longer present in the nasal and mouth discharges of the patient. The same applies to healthy carriers so far as it affects persistence of infectious discharges.

6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by the microscopic and bacteriological examination of the spinal fluid, and by bacteriological examination of nasal and pharyngeal secretions.
2. Isolation of infected persons and carriers until the nasopharynx is free from the infecting organisms, or, at the earliest, until one week after the fever has subsided—*While it is not necessary to culture the entire personnel of a station, it should be the practice of the service to culture all contacts and to isolate the positives found among them.*
3. Immunization may prove of value. Immunization by the use of vaccine is still in the experimental stage.
4. Quarantine—None.
5. Concurrent disinfection of discharges from the nose and mouth and of articles soiled therewith.
6. Terminal disinfection—Cleaning.

(B) General measures—

1. Search for carriers among families and associates of recognized cases by bacteriological examination of posterior nares of all contacts. *Carriers should be observed daily.*
2. Education as to personal cleanliness and necessity of avoiding contact and droplet infection.
3. Prevention of overcrowding, such as is common in living quarters, transportation conveyances, working places, and places of public assembly in the civilian population, and in inadequately ventilated closed quarters in barracks, camps, and ships among military units.

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CHICKEN POX.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The infectious agent is presumably present in the lesions of the skin and of the mucous membranes; the latter appearing early and rupturing as soon as they appear, render the disease communicable early, that is, before the exanthem is in evidence.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled by discharges from an infected individual.
4. *Incubation period:* Two to three weeks.
5. *Period of communicability:* Until the primary scabs have disappeared from the mucous membranes and the skin.

. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms. The differential diagnosis of this disease from smallpox is important, especially in people over 15 years of age.
2. Isolation—Exclusion of patient from school, and prevention of contact with nonimmune persons.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection of articles soiled by discharges from lesions.
6. Terminal disinfection—Thorough cleaning.

(B) General measures—None.

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CHOLERA.

. *Infectious agent: Vibrio cholerae.*

. *Source of infection:* Bowel discharges and vomitus of infected persons, and feces of convalescent or healthy carriers. Ten per cent of contacts may be found to be carriers.

. *Mode of transmission:* By food and water polluted by infectious agent; by contact with infected persons, carriers, or articles freshly soiled by their discharges; by flies.

. *Incubation period:* One to five, usually three, days, occasionally longer if the healthy-carrier stage, before development of symptoms, is included.

. *Period of communicability:* Usually 7 to 14 days or longer and until the infectious organism is absent from the bowel discharges.

. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
2. Isolation of patient in hospital or screened room.
3. Immunization by vaccination may be of value.
4. Quarantine—Contacts for five days from last exposure, or longer if stools are found to contain the cholera vibrio.
5. Concurrent disinfection—Prompt and thorough disinfection of the stools and vomited matter. Articles used by and in connection with the patient must be disinfected before removal from the room. Food left by the patient should be burned.

6. *Methods of control*—Continued.

(A) The infected individual and his environment—Continued.

6. Terminal disinfection—Bodies of those dying from cholera should be cremated, if practicable, or otherwise wrapped in a sheet wet with disinfectant solution and placed in water-tight caskets. The room in which a sick patient was isolated should be thoroughly cleaned and disinfected.

(B) General measures—

1. Rigid personal prophylaxis of attendants by scrupulous cleanliness, disinfection of hands each time after handling patient or touching articles contaminated by dejecta, the avoidance of eating or drinking anything in the room of the patient, and the prohibition of those attendant on the sick from entering the kitchen.
2. The bacteriological examination of the stools of all contacts to determine carriers. Isolation of carriers.
3. Water should be boiled, if used for drinking or toilet purposes, or if used in washing dishes or food containers, unless the water supply is adequately protected against contamination or is so treated, as by chlorination, that the cholera vibrio can not survive in it.
4. Careful supervision of food and drink. Where cholera is prevalent, only cooked foods should be used. Food and drink after cooking or boiling should be protected against contamination, as by flies and human handling.

(C) Epidemic measures—

Inspection service for early detection and isolation of cases; examination of persons exposed in infected centers for detection of carriers, with isolation or control of carriers; disinfection of rooms occupied by the sick; and the detention, in suitable camps for five days, of those desirous of leaving for another locality. Those so detained should be examined for detection of carriers.

DENGUE.

1. *Infectious agent:* Unknown.
2. *Source of infection:* The blood of infected persons.
3. *Mode of transmission:* By the bite of infected mosquitoes, probably *Aedes calopus* (perhaps also *Culex fatigans*).
4. *Incubation period:* Four to five days.
5. *Period of communicability:* During the febrile stage of the disease.

6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
      2. Isolation—The patient must be kept in a screened room.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None. Upon termination of the case fumigation of the room and house to destroy mosquitoes.

   (B) General measures—
      Measures directed elimination of mosquitoes. Screening of rooms.

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DIPHTHERIA.

1. *Infectious agent: Bacillus diphtheriae* (the Klebs-Loeffler bacillus).
2. *Source of infection:* Discharge from diphtheritic lesions of nose throat, conjunctiva, vagina, and wound surfaces. Secretions from the nose and throat of carriers of the bacillus.
3. *Mode of transmission:* Directly by personal contact, indirectly by articles freshly soiled with discharges or through infected milk or milk products.
4. *Incubation period:* Usually two to five days, occasionally longer if a healthy carrier stage precedes the development of clinical symptoms.
5. *Period of communicability:* Until virulent bacilli have disappeared from the secretions and the lesions. The persistence of the bacilli after the lesions have healed is variable. In fully three-quarters of the cases they disappear within two weeks. In 65 per cent of cases the bacilli disappear in four weeks. In exceptional cases virulent bacilli remain in the throat and discharges for from two to six months.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms with confirmation by bacteriological examination of discharges.
      2. Isolation—Until two cultures from the throat and two from the nose, taken not less than 24 hours apart, fail to show the presence of diphtheria bacilli. Isolation may be terminated if persistent diphtheria bacilli prove avirulent. *Where termination by culture is impracticable cases may be terminated with fair safety as a rule 16 days after onset of the disease.*

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      3. Immunization—Exposed susceptibles to be promptly immunized by antitoxin. (By susceptibles is meant such individuals as are found to be nonimmune by the Schick test, i. e., those who give a positive reaction.) *This procedure is costly and its effectiveness difficult to determine.*
      4. Quarantine—All exposed persons until shown by bacteriological examination not to be carriers.
      5. Concurrent disinfection of all articles which have been in contact with the patient and all articles soiled by discharges from the patient.
      6. Terminal disinfection—At the end of the illness, thorough airing and sunning of the sick room, with cleaning or renovation.
   (B) General measures—
      1. Pasteurization of milk supply.
      2. Application of the Schick test to all contacts, and immunization of all susceptibles. *The application of the Schick test to all men in the Navy who have been exposed is not always practicable and this process is left to the discretion of the individual medical officer.*
      3. Application of the Schick test to all children.
      4. Immunization by toxin-antitoxin inoculation of all susceptibles.
      5. Determination of presence or absence of carriers among contacts, and, so far as practicable, in the community at large.

DYSENTERY (AMEBIC).

1. *Infectious agent:* *Amoeba histolytica.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier, by flies.
4. *Incubation period:* Unknown.
5. *Period of communicability:* During course of disease and until repeated microscopic examination of stools shows absence of *Amoeba histolytica.*
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by microscopic examination of stools.

5. *Methods of control*—Continued.
(A) The infected individual and his environment—Continued.
2. Isolation—None.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection of the bowel discharges.
6. Terminal disinfection—Cleaning.
(B) General measures—
1. Boil drinking water, unless the supply is known to be free from contamination.
2. Water supply should be protected against contamination and supervision should be exercised over all foods eaten raw.

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DYSENTERY (BACILLARY).

1. *Infectious agent: Bacillus dysenteriae.*
2. *Source of infection:* The bowel discharges of infected persons.
3. *Mode of transmission:* By drinking contaminated water, and by eating infected foods, and by hand-to-mouth transfer of infected material; from objects soiled with discharges of an infected individual, or of a carrier, by flies.
4. *Incubation period:* Two to seven days.
5. *Period of communicability:* During the febrile period of the disease and until the organism is absent from the bowel discharges.
6. *Methods of control:*
(A) The infected individual and his environment—
1. Recognition of the disease—Clinical symptoms confirmed by serological and bacteriological tests.
2. Isolation—Infected individuals during the communicable period of the disease.
3. Immunization—Vaccines give considerable immunity. Owing to severe reactions their use is not universal, nor should it be made compulsory except under extreme emergency.
4. Quarantine—None.
5. Concurrent disinfection—Bowel discharges.
6. Terminal disinfection—Cleaning.
(B) General measures—
1. Rigid personal prophylaxis of attendants upon infected persons.
2. No milk or food for human consumption should be sold from a place occupied by a patient unless the persons engaged therein occupy quarters separate from the house where the patient is sick, and all utensils used are cleaned and kept in a separate building, and under a permit from the health officer.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
      3. All attendants upon persons affected with this disease should be prohibited from having anything to do with the handling of food.
      4. Necessary precautions against flies.

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FAVUS.

1. *Infectious agent: Achorion schoenleinii.*
2. *Source of infection:* Lesions of skin, particularly on scalp.
3. *Mode of transmission:* Direct contact with patient, and indirectly through toilet articles.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until skin and scalp lesions are all healed.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by microscopic examination of crusts.
      2. Isolation—Exclusion of patient from school and other public places until lesions are healed.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Toilet articles of patient.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Elimination of common utensils, such as hairbrushes and combs.
      2. Provision for adequate and intensive treatment and cure of cases of favus at hospitals and dispensaries, to abbreviate the period of infectivity of the patients.

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GERMAN MEASLES.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Secretions of the mouth and possibly of the nose.
3. *Mode of transmission:* By direct contact with the patient or with articles freshly soiled with the discharges from the nose or throat of the patient.
4. *Incubation period:* From 10 to 21 days.
5. *Period of communicability:* Eight days from onset of the disease.

Methods of control:

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms.
2. Isolation—Separation of the patient from nonimmune children and exclusion of the patient from school and public places for the period of presumed infectivity. *In the Navy all cases of German measles should be isolated.*
3. Immunization—None.
4. Quarantine—None except exclusion of nonimmune children from school and public gatherings from the eleventh to the twenty-second day from date of exposure to a recognized case.
5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled by discharges.
6. Terminal disinfection—Airing and cleaning.

(B) General measures—None.

NOTE.—The reason for attempting to control this disease is that may be confused with scarlet fever during its early stages; each erson having symptoms of the disease should therefore be placed nder the care of a physician and the case should be reported to the ocal department of health.

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GLANDERS.

Infectious agent: Bacillus mallei.

Source of infection: Discharges from open lesions of mucous membranes, or of the skin of human or equine cases of the disease (i. e., pus and mucus from the nose, throat, and bowel discharges from infected man and horse).

Mode of transmission: Contact with a case or with articles freshly soiled by discharges from a human or equine case.

Incubation period: Unknown.

Period of communicability: Until bacilli disappear from discharges or until lesions have healed.

Methods of control:

(A) The infected individual and his environment—

1. Recognition of the disease—By specific biological reactions, such as the complement fixation test, the mallein test, the agglutination test, or by nonspecific reactions, such as the Straus reaction, if confirmed by culture, or by identification of the *Bacillus mallei*, or by autopsy of doubtful cases.
2. Isolation—Human case, at home or hospital; for infected horses, destruction rather than isolation is advised.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      3. Immunization—None of established value or generally accepted.
      4. Quarantine of all horses in an infected stable until all have been tested by specific reaction and the removal of infected horses and terminal disinfection of stable have been accomplished.
      5. Concurrent disinfection.—Discharges from human cases and articles soiled therewith.
      6. Terminal disinfection.—Stables and contents where infected horses are found.
   (B) General measures—
      1. The abolition of the common drinking trough for horses.
      2. Sanitary supervision of stables and blacksmith shops.
      3. Semiannual testing of all horses by a specific reaction where the disease is common.
      4. Testing of all horses offered for sale where the disease is common.

NOTE.—In this disease, as in all infectious or communicable diseases from which both animals and man suffer, cases occurring in animals should be reported to the Department of Agriculture, and human cases should be reported to the Department of Health, reciprocal notification thereafter to be accomplished through official interdepartment channels.

GONORRHOEA.

1. *Infectious agent:* Gonococcus.
2. *Source of infection:* Discharges from lesions or inflamed mucous membranes and glands of infected persons, viz, urethral, vaginal, cervical, conjunctival mucous membranes, and Bartholin's or Skene's glands in the female, and Cowper's and the prostate glands in the male.
3. *Mode of transmission:* By direct personal contact with infected persons and indirectly by contact with articles freshly soiled with the discharges of such persons.
4. *Incubation period:* One to eight days, usually three to five days.
5. *Period of communicability:* As long as the gonococcus persists in any of the discharges, whether the infection be an old or a recent one.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease.—Clinical symptoms, confirmed by bacteriological examination or serum reaction.

Methods of control—Continued.

(A) The infected individual and his environment—Continued.

2. Isolation.—When the lesions are in the genito-urinary tract, exclusion from sexual contact, and when the lesions are conjunctival, exclusion from school or contact with children, as long as the discharges contain the infecting organism. (*In the Navy, restriction of liberty until gonococcus disappears from discharges.*)
3. Immunization.—None.
4. Quarantine.—None.
5. Concurrent disinfection—Discharges from lesions and articles soiled therewith.
6. Terminal disinfection—None.

(B) General measures—

1. Education in matters of sex hygiene, particularly as to the fact that continence in both sexes at all ages is compatible with health and development.
2. Provision for accurate and early diagnosis, and treatment in hospitals and dispensaries of infected persons with consideration for privacy of record and provision for following cases until cured.
3. Repression of prostitution by use of police power and control of use of living premises.
4. Restriction of sale of alcoholic beverages.
5. Restrictions of advertising of services or medicines for the treatment of sex diseases, etc.
6. Elimination of common towels and toilet articles from public places.
7. Use of prophylactic silver solution in the eyes of the new born.
8. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
9. Personal prophylaxis should be advised to those who expose themselves to opportunity for infection. *In the Navy personal prophylaxis is made compulsory by G. O. 69.*

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LEPROSY.

Infectious agent: Bacillus leprae.

Source of infection: Discharges from lesions.

Mode of transmission: By close, intimate, and prolonged contact with infected individuals. Flies and other insects may be mechanical carriers.

Incubation period: Prolonged, undetermined.

5. *Period of communicability:* Infectivity exists throughout the duration of the disease. Where good standards of personal hygiene prevail this disease is but slightly communicable.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination.
      2. Isolation for life in national leprosarium when this is possible.[2]
      3. Immunization—None.
      4. Quarantine—None.[3]
      5. Concurrent disinfection—Discharges and articles soiled with discharges.
      6. Terminal disinfection—Thorough cleansing of living premises of the patient.
   (B) General measures—
      1. Lack of information as to the determining factors in the spread and communication of the disease makes any but general advice in matters of personal hygiene of no value.
      2. As a temporary expedient, lepers may be properly cared for in local hospitals, or if conditions of the patient and his environment warrant, he may be allowed to remain on his own premises under suitable regulations.[2]

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MALARIA.

1. *Infectious agent:* The several species of malarial organisms.
2. *Source of infection:* The blood of an infected individual.
3. *Mode of transmission:* By bite of the infected Anopheles mosquitoes. The mosquito is infected by biting an individual suffering from acute or chronic malaria. The parasite develops in the body of the mosquito for from 10 to 14 days, after which time the sporozoites appear in its salivary glands.
4. *Incubation period:* Varies with the type of species of infecting organism and the amount of infection; usually 14 days in the tertian variety.
5. *Period of communicability:* As long as the malaria organism exists in the blood.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, always to be confirmed by microscopical examination of the blood. Repeated examinations may be necessary.

[2] The Public Health Service now places patients on parole, who have apparently been cured by the use of the ethyl ester of chaulmoogra oil.

[3] Patients suffering with leprosy are not allowed to enter United States.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      2. Isolation—Exclusion of patient from approach of mosquitoes, until his blood is rendered free from malarial parasites by thorough treatment with quinine.
      3. Immunization—None. The administration of prophylactic doses of quinine should be insisted upon for those constantly exposed to infection and unable to protect themselves against Anopheles mosquitoes.
      4. Quarantine—None.
      5. Concurrent disinfection—None. Destruction of Anopheles mosquitoes in the sick room.
   (B) General measures—
      1. Employment of known measures for destroying larvae of anophelines and the eradication of breeding places of such mosquitoes.
      2. Blood examination of persons living in infected centers to determine the incidence of infection.
      3. Screening sleeping and living quarters; use of mosquito nets.
      4. Killing mosquitoes in living quarters.

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MEASLES.

1. *Infectious agent:* A filterable virus.
2. *Source of infection:* Buccal and nasal secretions of an infected individual.
3. *Mode of transmission:* Directly from person to person; indirectly through articles freshly soiled with the buccal and nasal discharges of an infected individual. The most easily transmitted of all communicable diseases.
4. *Incubation period:* Seven to eighteen days; usually 14 days.
5. *Period of communicability:* During the period of catarrhal symptoms and until the cessation of abnormal mucous membrane secretions—minimum period of seven days; from two days before to five days after the appearance of the rash.
6. *Methods of control: Measles is more highly communicable than any of the communicable diseases of the respiratory type with the possible exception of influenza. It is a difficult disease to control because it is communicable in the prodromal or pre-eruptive stage before the disease is recognizable.*
   (A) The infected individual and his environment—
      1. Recognition of the disease.—*As soon as possible by the clinical symptoms, special attention being given to slight rise in temperature, catarrhal inflammation of the throat, nose, and*

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      1. Recognition of the disease—Continued.

eyes, and Koplik's spots—small bluish-white spots, the size of a pin head, surrounded by a reddish areola on the mucous membrane of the cheeks and lips.

Early detection of every new case with prompt isolation is the most important of practicable measures for the suppression of an outbreak of measles. Careful daily inspection of the entire personnel, or at least, all who could possibly have been exposed, is a very important preventive measure in this connection. All members of the crew should be instructed to report at the sick bay immediately in case any symptom develops which may be a prodrome of measles. Hospital corpsmen, chief petty officers, and petty officers should be on the alert to see that these instructions are carried out. As pointed out by Gatewood, in his Naval Hygiene, new cases tend to appear during an outbreak in successive crops at intervals of 11 to 14 days. Special vigilance is indicated toward the end of each interval but inspections should be performed with care at all times.

      2. Isolation.—*During period of communicability and for at least seven days after the appearance of the rash. All persons who show presumptive signs of developing the disease should also be promptly isolated. Every person who has a temperature of 99.5° F., cough, coryza, or congestion of the conjunctivae should be regarded as a suspect.*

      3. Management of the case.—*Measles patients should be isolated in quarters that can be adequately ventilated and kept uniformly warm. There should be at least 8 feet of separation between centers of beds, and screens should be placed or strung between beds to facilitate cubicle isolation.*

In the isolation hospital, patients whose throats show the presence of haemolytic streptococci should be removed from the general measles ward and isolated in a special group or groups. In any event, patients developing pneumonia should be removed from other cases of measles and treated separately or in a measles-pneumonia ward.

Careful bedside disinfection and a rigid cubicle system technic of asepsis should be practiced in all cases, including the invariable use of caps and gowns and immediate disinfection of the hands of the medical officer, hospital corpsman, or other person each time after coming in contact with the case. Flies must be excluded. Separate gowns should be used for attend-

. *Methods of control*—Cntinued.

(A) The infected individual and his environment—Continued.

3. Management of the case—Continued.

ance upon different patients or different groups of patients, and gowns should be kept clean by frequent sterilization. It is only by minute attention to details that cross infection in hospital can be prevented.

In view of susceptibility to pneumonia, measles patients should be kept in bed for five days after the temperature has returned to normal, and they should be retained in hospital, in a convalescent ward, perhaps, for at least 10 days after convalescence is established.

As a general policy, measles patients should be promptly transferred to hospital. However, in cold and stormy weather a long ambulance ride or transfer by boat involves considerable risk. Should it be impracticable to avoid such risk the patient should be warmly clad; every effort should be made to protect him from exposure and to prevent chilling.

4. Immunization—None.

5. Quarantine—*In civil practice when the exposure has occurred in the same household, children who have not had measles should be excluded from school until 18 days have elapsed since appearance of the rash in the last case. It is permissible in accordance with modern ideas to allow a susceptible child to continue at school for seven days after the date of appearance of earliest symptoms in the first case to which exposed; or, in the event of a single known exposure, for seven days from that time. The same practice should be followed in the case of a susceptible teacher who has been exposed to the disease. It is good practice to restrict the movements of other susceptible adults, known to have been exposed to measles, during the last few days of the incubation period. While often impracticable in civil public health work, this measure can usually be applied in the Navy and among its civilian employees. Exposed susceptible persons should also be excluded from all public gatherings during the 14-day incubation period.*

Quarantine of naval vessels or naval stations in which measles has occurred is unnecessary. Definitely determined susceptible contacts may be quarantined within the organization. At naval training stations, companies of recruits under training, in which a case of measles appears, should be segregated from other companies, and actual contacts should be separated from the rest of the unit.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      6. Concurrent disinfection—*All articles soiled with secretions of the nose and throat.*
      7. Terminal disinfection—*Thorough cleansing, airing, and sunning of the room occupied by a patient with this disease is all that is necessary. Terminal fumigation is of little or no value, as the virus of measles does not withstand drying or live long on fomites. After 14 days have elapsed there is little danger in occupying rooms previously occupied by measles patients.*
   (B) General measures—
      1. *Daily examination of exposed persons and of persons possibly exposed. A nonimmune person exhibiting a rise of temperature of 1 degree or more should be promptly isolated pending diagnosis.*
      2. *Where daily observation of school children by a physician or nurse is practicable, schools should not be closed or classes discontinued. Similar rules should apply in handling enlisted men; it should not be necessary to interfere with drills and routine training.*
      3. *Education of the public as to the danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.*
      4. *In naval organizations when measles occurs, or is liable to be introduced, the personnel should be acquainted with the nature of the disease, the character of its prodromal symptoms, and the measures necessary to prevent its spread. All necessary instructions should be given to the crew verbally and posted on the bulletin board. Attention should be paid to the sterilization of mess gear and avoidance of the use of drinking utensils and other articles in common.*

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MUMPS.

1. *Infective organism:* Unknown.
2. *Source of infection:* Secretions of the mouth and possibly of the nose.
3. *Mode of transmission:* By direct contact with an infected person or with articles freshly soiled with the discharges from the nose or throat of such infected person.
4. *Incubation period:* From 4 to 25 days. The most common period 18 days, accepted as usual. A period of 21 days is not uncommon.

5. *Period of communicability:* Unknown, but assumed to persist until the parotid gland has returned to its normal size.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease inflammation of Steno's duct may be of assistance in recognizing the early stage of the disease. The diagnosis is usually made on swelling of the parotid gland.
      2. Isolation—Separation of the patient from nonimmune children and exclusion of the patient from school and public places for the period of presumed infectivity. (See 5.)
      3. Immunization—None.
      4. Quarantine—Limited to exclusion of nonimmune children from school and public gatherings for 21 days after last exposure to a recognized case.
      5. Concurrent disinfection—All articles soiled with the discharges from the nose and throat of the patient.
      5. Terminal disinfection—None.
   (B) General measures—None.

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PARATYPHOID FEVER.

1. *Infectious agent: Bacillus paratyphosus* A or B.
2. *Source of infection:* Bowel discharges and urine of infected persons, and foods contaminated with such discharges of infected persons or of healthy carriers. Healthy carriers may be numerous in an outbreak.
3. *Mode of transmission:* Directly by personal contact; indirectly by contact with articles freshly soiled with the discharges of infected persons or through milk, water, or food contaminated by such discharges.
4. *Incubation period:* Four to ten days; average, seven days.
5. *Period of communicability:* From the appearance of prodromal symptoms, throughout the illness and relapses, during convalescence, and until repeated bacteriological examinations of discharges show absence of the infecting organism.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test, and by bacteriological examination of blood, bowel discharges, or urine.
      2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as can not command adequate sanitary environment and nursing care in their homes.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      3. Immunization of exposed susceptibles. *Navy Regulations require that all men shall be immunized against the paratyphoid fever.*
      4. Quarantine—None.
      5. Concurrent disinfection—Disinfection of all bowel and urinary discharges and articles soiled with them.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Purification of public water supplies.
      2. Pasteurization of public milk supplies.
      3. Supervision of other food supplies and of food handlers.[4]
      4. Prevention of fly breeding.
      5. Sanitary disposal of human excreta.
      6. Extension of immunization by vaccination as far as practicable.
      7. Supervision of paratyphoid carriers and their exclusion from the handling of foods.
      8. Systematic examination of fecal specimens from those who have been in contact with recognized cases to detect carriers.
      9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.
      10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

PLAGUE.

(BUBONIC, SEPTICEMIC, PNEUMONIC.)

1. *Infectious agent: Bacillus pestis.*
2. *Source of infection:* Blood of infected persons and animals and sputum of human cases of plague pneumonia.
3. *Mode of transmission:* Direct, in the pneumonic form. In other forms the disease is generally transmitted by the bites of fleas (*Loemopsylla cheopis* and *Ceratophyllus fasciatus*), by which the disease is carried from rats to man, also by fleas from other rodents. Accidental, by inoculation, or by the bites of infected animals. Bedbugs may transmit the infection; flies may possibly convey the infection.

[4] The human disease paratyphoid fever should not be confused with cases of food poisoning, or infection due to enteritidis bacilli of animal origin.

4. *Incubation period:* Commonly from 3 to 7 days, although occasionally prolonged to 8 or even 14 days.
5. *Period of communicability:* Until convalescence is well established, period undetermined.
6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by bacteriological examination of blood, pus from glandular lesion, or sputum.
2. Isolation—Patient in hospital if practicable; if not, in a screened room which is free from vermin.[5]
3. Immunization—Passive immunization of known exposed contacts; active immunization of those who may be exposed.
4. Quarantine—Contacts for seven days.
5. Concurrent disinfection—All discharges and articles freshly soiled therewith.
6. Terminal disinfection—Thorough cleaning followed by thorough disinfection.

(B) General measures—

1. Extermination of rats and vermin by use of known methods for their destruction; destruction of rats on ships arriving from infected ports; examination of rats, ground squirrels, etc., in areas where the infection persists, for evidence of endemic or epidemic prevalence of the disease among them.
2. Supervision of autopsies of all deaths during epidemics.
3. Supervision of the disposal of the dead during epidemics, whether by burial, transfer, or holding in vault, whatever the cause of death.
4. Cremation or burial in quicklime of those dying of this disease.

POLIOMYELITIS.

1. *Infectious agent:* Not definitely determined. Believed to be a filterable virus.
2. *Source of infection:* Nose, throat, and bowel discharges of infected persons, or articles recently soiled therewith. Healthy carriers are supposed to be common.
3. *Mode of transmission:* By direct contact with an infected person or with a carrier of the virus, or indirectly by contact with articles freshly soiled with the nose, throat, or bowel discharges of such persons.

[5] In plague pneumonia, personal prophylaxis, to avoid droplet infection, must be carried out by persons who come in contact with the sick. Masks or veils of cheesecloth should be worn as protective measures.

4. *Incubation period:* From 3 to 10 days, commonly 6 days.
5. *Period of communicability:* Unknown; apparently not more than 21 days from the onset of disease, but many precede onset of clinical symptoms by several days.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, assisted by chemical and microscopical examination of the spinal fluid.
      2. Isolation of all recognized cases in screened rooms.
      3. Immunization—None.
      4. Quarantine of exposed children of the household and of adults of the households whose vocation brings them into contact with children, or who are food handlers, for 14 days from last exposure to a recognized case.
      5. Concurrent disinfection—Nose, throat, and bowel discharges and articles soiled therewith.
      6. Terminal disinfection—Cleaning.
   (B) General measures during epidemics—
      1. Search for and examination of all sick children should be made.
      2. All children with fever should be isolated pending diagnosis.
      3. Education in such technique of bedside nursing as will prevent the distribution of infectious discharges to others from cases isolated at home.

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PNEUMONIA.

1. *Infectious agent:* Various pathogenic bacteria commonly found in the nose, throat, and mouth, such as the pneumococcus, the bacillus of Freidlander, the influenza bacillus, etc.
2. *Source of infection:* Discharges from the mouth and nose of apparently healthy carriers, as well as of recognized infected individuals, and articles freshly soiled with such discharges.
3. *Mode of transmission:* By direct contact with an infected person or with articles freshly soiled with the discharges from the nose or throat of, and possibly from infected dust or rooms occupied by, infected person.
4. *Incubation period:* Short, usually two to three days.
5. *Period of communicability:* Unknown; presumably until the mouth and nasal discharges no longer carry the infectious agent in an abundant amount or in a virulent form.

5. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms. Specific infecting organisms may be determined by serological and bacteriological tests early in the course of the disease.
2. Isolation—Patient during clinical course of the disease.
3. Immunization—None; vaccines are worthy of further careful trial.
4. Quarantine—None.
5. Concurrent disinfection—Discharges from the nose and throat of the patient.
6. Terminal disinfection—Thorough cleaning, airing, and sunning.

(B) General measures—

In institutions and camps, when practicable, people in large numbers should not be congregated closely within doors. The general resistance should be conserved by good feeding, fresh air, temperance in the use of alcoholic beverages, and other hygienic measures.

NOTE.—The early reporting of pneumonia is highly desirable in view of its communicability and the possibility of effective treatment of certain types with curative sera.

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RABIES.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Saliva of infected animals, chiefly dogs.
3. *Mode of transmission:* Inoculation with saliva of infected animals through abrasion of skin or mucous membrane, almost always by bites or scratches.
4. *Incubation period:* Usually two or six weeks. May be prolonged to six months or even longer.
5. *Period of communicability:* For 15 days in the dog (not known in man) before the onset of clinical symptoms and throughout the clinical course of the disease.
6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by the presence of Negri bodies in the brain of an infected animal, or by animal inoculations with material from the brain of such infected animal.
2. Isolation—None if patient is under adequate medical supervision and the immediate attendants are warned of possibility of inoculation by human virus.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      3. Immunization—Preventive vaccination (Pasteur treatment) after exposure to infection by inoculation.
      4. Quarantine—None.
      5. Concurrent disinfection of saliva of patient and articles soiled therewith.
      6. Terminal disinfection—Thorough cleaning.
   (B) General measures—
      1. Muzzling of dogs when on public streets or in places to which the public has access.
      2. Detention and examination of dogs suspected of having rabies.
      3. Immediate antirabic treatment of people bitten by dogs or by other animals suspected or known to have rabies, unless the animal is proved not to be rapid by subsequent observation or by microscopic examination of the brain and cord.

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ROCKY MOUNTAIN SPOTTED OR TICK FEVER.

1. *Infectious agent:* Unknown.
2. *Source of infection:* Blood of infected animals, and infected ticks (Dermacentor species).
3. *Mode of transmission:* By bites of infected ticks.
4. *Incubation period:* Three to ten days, usually seven days.
5. *Period of communicability:* Has not been definitely determined, probably during the febrile stage of the disease.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms of the disease in areas where the disease is known to be endemic.
      2. Isolation—None, other than care exercised to protect patients from tick bites when in endemic areas.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—None. All ticks on the patient should be destroyed.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Personal prophylaxis of persons entering the infected zones during the season of ticks, by wearing tick-proof clothing, and careful daily search of the body for ticks which may have attached themselves.
      2. The destruction of ticks by clearing and burning vegetables on the land in infested zones.

. *Methods of control*—Continued.

(B) General measures—Continued.

3. The destruction of ticks on domestic animals by dipping, and the pasturing of sheep on tick-infested areas where the disease is prevalent, with the object of diminishing the number of ticks.

4. The destruction of small mammalian hosts, such as ground squirrels, chipmunks, etc.

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SCARLET FEVER

. *Infectious agent:* Unknown.

2. *Source of infection:* The belief at present is that the virus is contained in the secretions from the nose and throat, in the blood, and in the lymph nodes, and that it is given off in the discharges from the mouth, the nose, the ears, and from broken down glands of infected persons.

3. *Mode of transmission:* Directly by personal contact with an infected person; indirectly by articles freshly soiled with discharges of an infected person, or through contaminated milk.

4. *Incubation period:* Two to seven days, usually three or four days.

5. *Period of communicability:* Four weeks from the onset of the disease, without regard to desquamation, and until all abnormal discharges have stopped and all open sores have healed.

6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—By clinical symptoms.

2. Isolation—In home or hospital, maintained in each case until the end of the period of infectivity.

3. Quarantine—Exclusion of exposed susceptible children and teachers from school, and food handlers from their work, until seven days have elapsed since last exposure to a recognized case. *In the Navy it is not considered necessary to quarantine groups of men who have been exposed to an infected individual.*

4. Concurrent disinfection—Of all articles which have been in contact with a patient and all articles soiled with discharges of the patient.

5. Terminal disinfection—Thorough cleaning.

(B) General measures:

1. Daily examination of exposed children and of other possibly exposed persons for a week after last exposure.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
      2. Schools should not be closed where daily observation of the children by a physician or nurse can be provided for.
      3. Education as to special danger of exposing young children to those exhibiting acute catarrhal symptoms of any kind.
      4. Pasteurization of milk supply.

SEPTIC SORE THROAT.

1. *Infectious agent:* Streptococcus (hemolytic type).
2. *Source of infection:* The human nasopharynx, usually the tonsils, any case of acute streptococcus inflammation of these structures being a potential source of infection, including the period of convalescence of such cases. The udder of a cow infected by the milker is an occasional source of infection. In such udders the physical signs of mastitis are usually absent.[6]
3. *Mode of transmission:* Direct or indirect human contact; consumption of raw milk from an infected udder.
4. *Incubation period:* One to three days.
5. *Period of communicability:* In man, presumably during the continuance of clinical symptoms; in the cow, during the continuance of discharge of the streptococci in the milk, the condition in the udder tending to a spontaneous subsidence. The carrier stage may follow convalescence and persist for some time.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms. Bacteriological examination of the lesions or discharges from the tonsils and nasopharynx may be useful.
      2. Isolation—During the clinical course of the disease and convalescence, and particularly exclusion of the patient from participation in the production or handling of milk or milk products.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Articles soiled with discharges from the nose and throat of the patient.
      6. Terminal disinfection—Cleaning.

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[6] Mastitis in the cow, due to bovine streptococci, is not a cause of septic sore throa in man unless a secondary infection of the udder by a human type of streptococcus take place.

. *Methods of control*—Continued.

(B) General measures—

1. Exclusion of suspected milk supply from public sale or use until pasteurized. The exclusion of the milk of an infected cow or cows in small herds is possible when based on bacteriological examination of the milk of each cow, and preferably the milk from each quarter of the udder at frequent intervals.
2. Pasteurization of all milk.
3. Education in the principles of personal hygiene and avoidance of the use of common towels, drinking and eating utensils.

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SMALLPOX.

. *Infectious agent*: Unknown.

2. *Source of infection*: Lesions of the skin and mucous membranes of infected persons.

3. *Mode of transmission*: By direct personal contact; by articles soiled with discharges from lesions. The virus may be present in all body discharges, including feces and urine. It may be carried by flies.

4. *Incubation period*: Twelve to fourteen days. (Cases with incubation period of 21 days are reported.)

5. *Period of communicability*: From first symptoms to disappearance of all scabs and crusts.

6. *Methods of control*:

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms. Tests for *immunity* may prove useful.
2. Isolation—Hospital isolation in screened wards, free from vermin, until the period of infectivity is over.
3. Immunization—*Vaccination is made compulsory by the Navy Regulations.*
4. Quarantine—Segregation of all exposed persons for 21 days from date of last exposure, or until protected by vaccination.
5. Concurrent disinfection of all discharges and articles soiled therewith.
6. Terminal disinfection—Thorough cleaning and disinfection of premises.

74993—21——12

6. *Methods of control*—Continued.
   (B) General measures—
   General vaccination in infancy, revaccination of children on entering school, and of entire population when the disease is prevalent. *Medical officers must carry out the procedure of vaccination with greatest care.*

NOTE.—Adjustment of the time of vaccination of infants to avoid teething or other milk and common indisposition, the time of vaccination of children of the runabout age and older with preference for the cool months of the year, and the manner of vaccination with preference for the single puncture or small area scratch method through the droplet of virus are important to observe in order to avoid possible complications or secondary and subsequent infections at the site of vaccination. Vaccination before the age of six months is particularly desirable.

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SYPHILIS.

1. *Infectious agent: Treponema pallidum.*
2. *Source of infection:* Discharges from the lesions of the skin and mucous membranes, and the blood of infected persons, and articles freshly soiled with such discharges or blood in which the *Treponema pallidum* is present.
3. *Mode of transmission:* By direct personal contact with infected persons, and indirectly by contact with discharges from lesions or with the blood of such persons.
4. *Incubation period:* About three weeks. (In rare instances reported to have been as long as 70 days.)
5. *Period of communicability:* As long as the lesions are open upon the skin or mucous membranes and until the body is freed from the infecting organisms, as shown by microscopic examination of material from ulcers and by serum reaction.
6. *Methods of control:*
   (A) The infected individual and his environment—
   1. Recognition of the disease—Clinical symptoms, confirmed by microscopical examination of discharges and by serum functions.
   2. Isolation—Exclusion from sexual contact and from preparation or serving of food during the early and active period of the disease; otherwise none, unless the patient is unwilling to heed, or is incapable of observing the precautions required by the medical adviser. *In the Navy restriction of men's liberty must be enforced as long as there are open lesions.*

. *Methods of control*—Continued.

(A) The infected individual and his environment—Continued.

3. Immunization—None.
4. Quarantine.—None
5. Concurrent disinfection of discharges and of articles soiled therewith.
6. Terminal disinfection—None.

(B) General measures—

1. Examination in matters of sexual hygiene, particularly as to the fact that continence in both sexes and at all ages is compatible with health and development.
2. Provision for accurate and early diagnosis and treatment, in hospitals and dispensaries, of infected persons, with consideration for privacy of record, and provision for following cases until cured.
3. Repression of prostitution by use of the police power and control of use of living premises.
4. Restriction of sale of alcoholic beverages.
5. Restriction and advertising of services or medicine for treatment of sex diseases, etc.
6. Abandonment of the use of common towels, cups, and toilet articles and eating utensils.
7. Exclusion of persons in the communicable stage of the disease from participation in the preparing and serving of food.
8. Personal prophylaxis should be advised to those who expose themselves to opportunity to infection. *Personal prophylaxis in the Navy is made compulsory by G. O. 69.*

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TETANUS.

. *Infectious agent: Bacillus tetani.*

. *Source of infection:* Animal manure, and soil fertilized with animal manure, and, rarely, the discharges from wounds.

. *Mode of transmission:* Inoculation, or wound infection.

. *Incubation period:* Six to fourteen days, usually nine.

. *Period of communicability:* Patient not infectious except in rare instances where wound discharges are infectious.

Methods of control:

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms; may be confirmed bacteriologically.
2. Isolation—None.
3. Immunization—By antitoxin, single or repeated injection.

6. *Methods of control*—Continued.
   (A) The infected individual and his environment—Continued.
      4. Quarantine—None.
      5. Concurrent disinfection—None.
      6. Terminal disinfection—None.
   (B) General measures—
      1. Supervision of the practice of obstetrics.
      2. Educational propaganda such as "safety-first" campaign, and "safe and sane Fourth of July" campaign.
      3. Prophylactic use of tetanus antitoxin where wounds have been acquired in regions where the soil is known to be heavily contaminated, and in all cases where wounds are ragged or penetrating.
      4. Removal of all foreign matter as early as possible from all wounds.
      5. Supervision of biological products, especially vaccines and sera.

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TRACHOMA.

1. *Infectious agent:*[7] The chief, although not yet known to be the only, infectious agents are the hemogloginophilic bacilli including the so-called Koch-Weeks bacillus.
2. *Source of infection:* Secretions and purulent discharges from the conjunctivae and adnexed mucous membranes of the infected persons.
3. *Mode of transmission:* By direct contact with infected persons and indirectly by contact with articles freshly soiled with the infective discharges of such persons.
4. *Incubation period:* Undetermined.
5. *Period of communicability:* During the persistence of lesions of the conjunctivae and of the adnexed mucous membranes or of discharges from such lesions.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms.
         Bacteriological examination of the conjunctival secretions and lesions may be useful.
      2. Isolation—Exclusion of the patient from general school classes
      3. Immunization—None.
      4. Quarantine—None.

[7] It has not yet been proved that trachoma is due to one specific organism.

. *Methods of control*—Continued.

(A) The infected individual and his environment—Continued.

5. Concurrent disinfection of discharges and articles soiled therewith.
6. Terminal disinfection—None.

(B) General measures—

1. Search for cases by examination of school children, of immigrants, and among the families and associates of recognized cases; in addition, search for acute secreting disease of conjunctivae and adnexed mucous membranes, both among school children and in their families, and treatment of such cases until cured.
2. Elimination of common towels and toilet articles from public places.
3. Education in the principles of personal cleanliness and the necessity of avoiding direct or indirect transference of body discharges.
4. Control of public dispensaries where communicable eye diseases are treated.

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TRICHINOSIS.

. *Infectious agent: Trichinella spiralis.*

. *Source of infection:* Uncooked or insufficiently cooked meat of infected hogs.

. *Mode of transmission:* Consumption of undercooked infected pork products.

. *Incubation period:* Variable; usually about one week.

. *Period of communicability:* Disease is not transmitted by human host.

. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by microscopical examination of muscle tissue containing trichinae.
2. Isolation—None.
3. Immunization—None.
4. Quarantine—None.
5. Concurrent disinfection—Sanitary disposal of the feces of the patient.
6. Terminal disinfection—None.

(B) General measures—

1. Inspection of pork products for the detection of trichinosis.
2. Thorough cooking of all pork products at a temperature of 100° F. or over.

TUBERCULOSIS (PULMONARY).

1. *Infectious agent: Bacillus tuberculosis* (human). (In rare instances the bovine tubercle bacillus has been proved to be the cause of a pulmonary tuberculosis.)
2. *Source of infection:* The specific organism present in the discharges, or articles freshly soiled with the discharges from any open tuberculous lesions, the most important discharge being sputum. Of less importance are discharges from the intestinal and genito-urinary tracts, or from lesions of the lymphatic glands, bone, and skin.
3. *Mode of transmission:* Direct or indirect contact with an infected person by coughing, sneezing, or other droplet infection, kissing, common use of unsterilized food utensils, pipes, toys, drinking cups, etc., and possibly by contaminated flies and dust.
4. *Incubation period:* Variable and dependent upon the type of the disease.
5. *Period of communicability:* Exists as long as the specific organism is eliminated by the host. Commences when a lesion becomes an open one—i. e., discharging tubercle bacilli—and continues until it heals or death occurs.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—By clinical symptoms and by thorough physical examination, confirmed by bacteriological examination and by serological tests.
      2. Isolation of such "open" cases as do not observe the precautions necessary to prevent the spread of the disease.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection of sputum and articles soiled with it. Particular attention should be paid to prompt disposal or disinfection or sputum itself, of handkerchiefs, cloths, or paper soiled therewith, and of eating utensils used by the patient.
      6. Terminal disinfection—Cleaning and renovation.
   (B) General measures—
      1. Education of the public in regard to the dangers of tuberculosis and the methods of control, with especial stress upon the danger of exposure and infection in early childhood.
      2. Provision of dispensaries and visiting-nurse service for discovery of early cases and supervision of home cases.

6. *Methods of control*—Continued.
   (B) General measures—Continued.
      3. Provision of hospitals for isolation of advanced cases and sanatoria for the treatment of early cases.
      4. Provision of open-air schools and preventoria for pretuberculous children.
      5. Improvement of housing conditions and the nutrition of the poor.
      6. Ventilation and elimination of dusts in industrial establishments and places of public assembly.
      7. Improvement of habits of personal hygiene and betterment of general living conditions.
      8. Separation of babies from tuberculous mothers at birth.

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TUBERCULOSIS (OTHER THAN PULMONARY).

1. *Infectious agent: Bacillus tuberculosis* (human and bovine).
2. *Source of infection:* Discharges from mouth, nose, bowels, and genito-urinary tract of infected humans; articles freshly soiled with such discharges; milk from tuberculous cattle; rarely the discharging lesion of bones, joints, and lymph nodes.
3. *Mode of transmission:* By direct contact with infected persons, by contaminated food, and possibly by contact with articles freshly soiled with the discharges of infected persons.
4. *Incubation period:* Unknown.
5. *Period of communicability:* Until lesions are healed.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms confirmed by bacteriological and serological examinations.
      2. Isolation—None.
      3. Immunization—None.
      4. Quarantine—None.
      5. Concurrent disinfection—Discharges and articles freshly soiled with them.
      6. Terminal disinfection—Cleaning.
   (B) General measures—
      1. Pasteurization of milk and inspection of meats.
      2. Eradication of tuberculous cows from milch herds used in supplying raw milk.
      3. Patients with open lesions should be prohibited from handling foods which are consumed raw.

TYPHOID FEVER.

1. *Infectious agent: Bacillus typhosus.*
2. *Source of infection:* Bacillus discharges and urine of infected individuals. Healthy carriers are common.
3. Mode of transmission: Conveyance of the specific organism by direct or indirect contact with a source of infection. Among indirect means of transmission are contaminated water, milk, and shellfish. Contaminated flies have been common means of transmission in epidemics.
4. Incubation period: From 7 to 21 days, averaging 10 to 14 days.
5. *Period of communicability:* From the appearance of prodromal symptoms throughout the illness and relapses during convalescence and until repeated bacteriological examinations of the discharges show persistent absence of the infecting organism.
6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms, confirmed by specific agglutination test and bacteriological examination of blood, bowel discharges, or urine.
2. Isolation—In fly-proof room, preferably under hospital conditions, of such cases as can not command adequate sanitary environment and nursing care in their homes.
3. Immunization—Of susceptible who are known to have been exposed or are suspected of having been exposed. *Navy Regulations require that all men shall be immunized against typhoid fever.*
4. Quarantine—None.
5. Concurrent disinfection—Disinfection of all bowel and urinary discharges and articles soiled with them.
6. Terminal disinfection—Cleaning.

(B) General measures—

1. Purification of public water supplies.
2. Pasteurization of public milk supplies.
3. Supervision of other food supplies and of food handlers.
4. Prevention of fly breeding.
5. Sanitary disposal of human excreta.
6. Extension of immunization by vaccination as far as practicable.
7. Supervision of typhoid carriers and their exclusion from the handling of foods.
8. Systematic examination of fecal specimens from those who have been in contact with recognized cases to detect carriers.
9. Exclusion of suspected milk supplies pending discovery of the person or other cause of contamination of the milk.

. *Methods of control*—Continued.
(B) General measures—Continued.
10. Exclusion of water supply, if contaminated, until adequately treated with hypochlorite or other efficient disinfectant, or unless all water used for toilet, cooking, and drinking purposes is boiled before use.

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TYPHUS FEVER.

. *Infectious agent: Bacillus typhi-exanthematici*[8] is claimed to be the causative agent; not yet definitely determined.
. *Source of infection:* The blood of infected individuals.
. *Mode of transmission:* Infectious agent transmitted by lice.
. *Incubation period:* Five to twenty days; usually twelve days.
. *Period of communicability:* Until 36 hours have elapsed after the temperature reaches normal.
. *Methods of control:*
(A) The infected individual and his environment—
1. Recognition of the disease—Clinical symptoms. (Confirmation by bacteriological examination of blood is claimed by Plots.) *Finding of Rickettsia bodies.*
2. Isolation—in a vermin-free room. All attendants should wear vermin-proof clothing.
3. Immunization: Claimed to be practicable by use of vaccine (Plotz, Olitzky, and Baehr). Not yet generally accepted.
4. Quarantine—Exposed susceptibles for 12 days after last exposure.
5. Concurrent disinfection—None.
6. Terminal disinfection—Destroy all vermin and vermin eggs on body of patient, if not already accomplished. Destroy all vermin and eggs on clothing. Rooms to be rendered free from vermin.

(B) General measures—
Delousing of persons, clothing, and premises during epidemics, or when they have come or have been brought into an uninfected place from an infected community.

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WHOOPING COUGH.

. *Infectious agent: Bacillus pertussis* (Bordet, Gengou).
. *Source of infection:* Discharges from the laryngeal and bronchial mucous membranes of infected persons (sometimes also of infected dogs and cats, which are known to be susceptible).

[8] Dermacentroxenus rickettsi.

3. *Mode of transmission:* Contact with an infected person or animal or with articles freshly soiled with the discharges of such person or animal.
4. *Incubation period:* Within 14 days.
5. *Period of communicability:* Particularly communicated in the early catarrhal stages before the characteristic whoop makes the clinical diagnosis possible. Communicability probably persists not longer than two weeks after the development of the characteristic whoop or approximately four weeks after the onset of catarrhal symptoms.
6. *Methods of control:*
   (A) The infected individual and his environment—
      1. Recognition of the disease—Clinical symptoms, supported by a differential leucocyte count, and confirmed where possible by bacteriological examination of bronchial secretions.
      2. Isolation—Separation of the patient from susceptible children, and exclusion of the patient from school and public places, for the period of presumed infectivity.
      3. Immunization—Use of prophylactic vaccination recommended by some observers. Not effective in all cases.
      4. Quarantine—Limited to the exclusion of nonimmune children from school and public gatherings for 14 days after their last exposure to a recognized case.
      5. Concurrent disinfection—Discharges from the nose and throat of the patient and articles soiled with such discharges.
      6. Terminal disinfection—Cleaning of the premises used by the patient.
   (B) General measures—
      Education in habits of personal cleanliness and in the dangers of association or contact with those showing catarrhal symptoms with cough.

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YELLOW FEVER.

1. *Infectious agent:* Unknown. *The Leptrospira icteroides has been reported by Noguchi as the cause of yellow fever.*
2. *Source of infection:* The blood of infected persons.
3. *Mode of transmission:* By the bite of infected *Aedes calopus* mosquitoes.
4. *Incubation period:* Three to five days, occasionally six days.
5. *Period of communicability:* First three days of the fever.

6. *Methods of control:*

(A) The infected individual and his environment—

1. Recognition of the disease—Clinical symptoms.
2. Isolation—Isolate from mosquitoes in a special hospital ward or thoroughly screened rooms. If necessary, the room or ward should be freed from mosquitoes by fumigation. Isolation necessary only for the first three days of the fever.
3. Immunization—None. *Noguchi claims that he has produced a serum which has value as an immunizing agent.*
4. Quarantine—Contacts for six days.
5. Concurrent disinfection—None.
6. Terminal disinfection—None. Upon termination of case the the premises should be rendered free from mosquitoes by fumigation.

(B) General measures—Eliminate mosquitoes by rendering breeding impossible.

(C) Epidemic measures—

1. Inspection service for the detection of those ill with the disease.
2. Fumigation of houses in which cases of disease have occurred, and of all adjacent houses.
3. Destruction of *Aedes calopus* mosquitoes by fumigation; use of larvicides; eradication of breeding places.

HEALTH CONDITIONS IN THE NAVY.

Health conditions in the Navy for this season of the year are better ıan they have been at any time since records for the seasonal varia- on of disease have been kept in the Bureau of Medicine and Sur- ery. The admission rate for all causes for the four-week period ıding December 10 averaged 497 per thousand per annum. From ll indications it appears that the annual admission rate for all ıuses, entire Navy, for the year 1921 will be approximately 600 per ıousand per annum, which is the lowest in the past five years.

The accident rate of the Navy has also declined within the past ıonth. The annual admission rate for injuries and poisons for ıe four-week period ending December 10 was 60 per thousand per ınnum, which is considerably lower than at any time during the past ıree months.

Although, from past experience, it was expected that the morbidity ıtes for communicable disease would show an increase with the dvent of winter, these rates have continued to decline. The annual lmission rate for communicable disease, exclusive of influenza and enereal disease, for the past four weeks, was 42 per thousand. It ıay be predicted, with a fair degree of confidence, that the admission ıte for communicable disease for the entire year will not be higher ıan 80 per thousand per annum. If it had not been for the very igh incidence of communicable disease during the months of Janu- ry, February, and March the rate for the year would not be more ıan 40 per thousand per annum.

For the past several months the incidence of mumps has been very ow; the morbidity rate for the entire Navy for the four-week period nding December 10 was 1.3 per thousand. Pneumonia has also been ss prevalent than in past years at similar periods; the morbidity ate for the past month was 2.0 per thousand per annum. There has een very few cases of measles reported during the past few months, he rate for the past month being 0.5 per thousand per annum, as ompared with 18 per thousand per annum for 1920. Only sporadic ases of diphtheria and scarlet fever were reported during the past ıonth. The incidence of malaria is somewhat lower than in the revious month; the rate for the past month was 19.2 per thousand er annum, as compared with 25 per thousand per annum for the ıme period last year.

The incidence of communicable diseases at shore stations has been ery low for the past two or three months. The morbidity rate for ll communicable diseases, which are usually prevalent at training

stations, is now below 1 per thousand per annum. The incidence of the common communicable diseases for shore stations in the United States for the past four weeks is as follows: Malaria, 4.1 per thousand per annum; measles, 0.4 per thousand per annum; mumps, 1.5 per thousand per annum; pneumonia, 0.4 per thousand per annum; scarlet fever, 0.4 per thousand per annum.

There has been practically no change in the incidence of venereal disease during the past six or eight months, the annual admission rate varying from week to week. However, when the peaks are smoothed out the annual admission rate for the year has remained around 126 per thousand per annum for the entire Navy.

The mortality rate of the Navy continues to be lower than for any of the previous four years. The rate for 1921 is now approximately 2.6 per thousand per annum.

Hampton Roads and San Francisco, which are the only two training stations of any consequence receiving recruits at the present time, are both practically free from communicable disease, only sporadic cases being reported from time to time.

Few communicable diseases have been reported from any of the fleets. The venereal disease rates for ships cruising in foreign waters continue to be excessively high. In general, it may be said that the venereal disease rates of ships stationed in and around the United States are somewhat higher than the venereal disease rates for shore stations in the United States.

INTELLIGENCE DATA IN CONNECTION WITH A SANITARY SURVEY.

It is one of the functions of the Bureau of Medicine and Surgery to contribute its special knowledge toward the solution of strategic problems arising during the formulation of war plans to the end that there may be no avoidable loss in personnel or diminution in its effectiveness.

The performance of the duty requires, first, that the bureau point out to the planning body how the projected development of the campaign as tentatively sketched may be modified, or its successful termination jeopardized, by conditions bearing on the health of the personnel; second, that comprehensive plans be laid embracing sanitation, calculation of damage, estimates of requirements, and scheme of supply.

It is evident that if the bureau is competently to carry on this work it must be supplied with data from all over the world on which to base its recommendations and plans, and that it must depend largely on medical officers afloat and at foreign stations to furnish it with the data required. For the guidance of those in a position to gathe

nformation there is appended a table indicating the subjects on vhich reports should be made. It is suggested that the work be car-ied on in conjunction with the Intelligence Officer of the ship or sta-ion, especially that of a military nature.

Data desired:

A. CONCERNING THE COUNTRY.

Geographic.
Meteorologic.
Temperature, direct—physical effects: indirect—parasitic diseases.
Humidity.
Rainfall.
Winds.
Geologic:
Terrain.
Soil.
Water.
Bionomic:
Food and draught animals.
Toxic agents—plants, animals. fishes.
Ethnologic:
Racial characteristics.
Economic characteristics.
Social characteristics.
Customs.
Religious traits.
Educational status.
Habits of life:
Houses, suitability for billeting, etc.
Foods. Food deficiency diseases infectious—night soil.
Clothing.
Sewage disposal.
Water supply.
Illumination—electricity.
Diseases prevalent—endemic and social; epidemic, seasonal.
Sanitary laws and regulations in force.
Medical supply locally available:
Hospitals, or buildings suitable for.
Transportation, roads, railroads, animals, vehicles.
General supplies.
Noncombatants likely to become military charges.

B. CONCERNING ITS MILITARY ORGANIZATION.[1]

Mobilization:

What plan exists during peace for the utilization of specialists now on a civilian status (e. g., surgeons, bacteriologists, chemists, pharmacists, etc.) within the Army during war?

To what extent are physicians organized into a reserve force and trained in time of peace?

Supply:

Plan for establishing medical supply depots and advance distribution dumps in war. To what extent does the Medical Service control its supplies in the theater of operations, communication zone, zone of interior?

[1] Extracted from U. S. A. Medico-Military Review. June 15, 1921.

What is the plan for the maintenance of supplies during combat (including front-line troops)? If on an automatic basis, give the basic plan or table.

Basic factors used in computing the medical supplies needed in war for a field army or entire force.

What ratio does medical tonnage bear to all tonnage, especially as regards the amount clearing regulating stations for combat troops? How many cubic feet per weight ton of 2,000 pounds is represented by medical supplies?

Training:

System of instruction (routine and specialties) of commissioned and enlisted personnel in peace and war:

1. At schools (also give curricula, outlines of courses, time devoted to courses, student capacity.
2. At training camps, student capacity, with troops in field.
3. During maneuvers (in conjunction with line or purely medical service).

To what extent are medical officers trained for general staff duties and for duty with staffs of higher commands (e. g., corps, army, general headquarters).

Training literature (copies are desired):

Medical service regulations.
Drill manuals.
Sanitary tactics (details of instruction therein, textbooks, etc.).

Miscellaneous:

The status and duties of the Medical Department with the Air Service, special training of its medical personnel, and the appliances developed for testing the physical abilities of aviators.

Attitude of War Department toward the Articles of the Geneva Convention, rules of land warfare, security and treatment of casualties within enemy territory, the neutrality of Medical Department personnel, and the use of means calculated to spread communicable diseases during war.

Action being taken by Medical Service in cooperation with War Department in the development of war plans.

Probable effect of improvements in ordnance, gas, etc., on number and type of casualties and methods developed to offset them.

New methods of attack and defense which will have a bearing upon Medical Department formations and their work in the field.

TATTOOING DANGEROUS.

Cases of syphilis acquired from the instruments used by syphilitic operators during the process of tattooing have been reported from time to time. A primary syphilitic sore, acquired in Plymouth,

England, appeared on the forearm of a member of the crew of the U. S. S. *Olympia*. The patient reported at sick bay November 14, 1921, complaining of a slowly healing sore over a recent tattoo mark on his right forearm. The sore appeared about three weeks after he had been tattooed. The lesion was buttonlike and the adjacent lymph glands were indurated. A microscopical, dark field examination of some serum from the sore revealed the Spirocheta pallida. The sore healed rapidly under the influence of salvarsan.

NOTES FROM UNITED STATES NAVAL HOSPITAL, ST. THOMAS, VIRGIN ISLANDS.

In August the local health department received information of the occurrence of 76 cases of dengue; in September, 58 cases were reported; and in October, 27 cases. Approximately 50 per cent of all cases occurred among the enlisted personnel of the Marine Corps stationed at St. Thomas, and a few cases among the small detachment in St. Croix. Only the white population of the islands was affected, and largely those who have been at this station less than a year.

A vigorous campaign to exterminate mosquitos was carried on by the sanitary department during August and September, with but partial success. In spite of all efforts the poor natives persist in storing water in all sorts of receptacles, even in tomato tins.

During the last two months measles of a virulent type has spread over the island of St. John to such an extent that nearly all children have had the disease. Recently the infection was imported to the island of St. Thomas, and over 100 cases developed. Thus far, however, the disease has not appeared among the Navy and Marine Corps personnel.

SMALLPOX IN THE UNITED STATES.

The attention of all medical officers is invited to the following article which appeared in the Journal of the American Medical Association for December 3, 1921:

"In his History of England, Macaulay described smallpox as 'the most terrible of all the ministers of death. The havoc of the plague,' he continues, 'was far more rapid, but the plague visited our shores only once or twice within living memory; and the smallpox was always present, filling the churchyards with corpses, tormenting

with constant fears all whom it had not yet stricken, leaving on those whose lives it spared the hideous traces of its power, turning the babe into a changeling at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to the lover.' One hundred and twenty-five years have elapsed since the first vaccination performed by Edward Jenner in 1796. Persons living to-day, when the great menace that once conquered even America is no longer feared, can scarcely appreciate the true significance of the tribute which Thomas Jefferson paid to Jenner in these words: 'You have erased from the calendar of human afflictions one of its greatest. Yours is the comfortable reflection that mankind can never forget that you have lived; future nations will know by history only that the loathsome smallpox has existed, and by you has been extirpated.' In the light of these comments, it seems almost incredible that the U. S. Public Health Service should find it possible to report more than 16,000 cases of smallpox in eight States alone in which the histories were furnished in 1920; while, from information supplied by only seven States, more than 18,000 cases have been reported with history during the first six months of the present year. In Minnesota, for example, 8,238 of these smallpox cases were actually reported.'[2] The real lesson, however, is to be found in the statistics of vaccination for this formidable array of patients. More than two-thirds of the entire 34,000 afflicted had never been successfully vaccinated. About one-twentieth of them had been vaccinated more than seven years before the attack; and, of the remainder, the histories were in most cases uncertain with reference to their vaccination status, or were not obtained. Only 2 per cent of the patients were actually reported to have been vaccinated within seven years prior to the attack. Again the lesson to the public is clear and imperative—and there is little left for the consolation of the antivaccination cult, which is doubtless responsible directly or indirectly for some of this unnecessary suffering."

The following is quoted from the "Bulletin of the Chicago School of Sanitary Instruction" for November 26, 1921.

"The department of health is reliably informed that at this time smallpox in its most malignant and dangerous form is prevalent in certain sections of the country. This means that this is the type of smallpox that is fatal to human life, and because this is true the commissioner of health would urge upon the people of Chicago the importance of protecting themselves against this new and dangerous outbreak of the disease by vaccination. The following facts may be cited in support of the statements just made. Here they are:

[2] Vaccination Histories of Smallpox Patients, Pub. Health Rep. 36: 2555 (Oct. 14), 1921.

"One day last week a railway clerk, unvaccinated, running between Chicago and Kansas City, where he had been exposed to smallpox, was found stricken with the disease and sent to the isolation hospital November 18. Four days later he died of smallpox of the hemorrhagic type.

"The important facts to be stated in connection with this man's untimely death is that had he been properly vaccinated he would still be alive and handling mail for Uncle Sam.

"A young girl, also exposed to smallpox in Kansas City, came to Lagrange to visit friends last week. She is now down with smallpox, and as a result she and the entire family with whom she was visiting are under strict quarantine in that suburb. It is of interest to note, however, that the house in which she is quarantined is just across the street from a public school, in which, doubtless, there are many unvaccinated children. The department's advice to the people of Lagrange would be to get vaccinated without delay.

"Chicago has not had a visitation of smallpox of the virulent type for a number of years. As a matter of fact, too, the type prevailing throughout the country also has been mild with almost a negligible death rate. This year, however, the type seems to be changing, as it usually does in time. But, because of the mild forms in which it has been prevalent for some time, people have become careless and indifferent about being vaccinated. In fact, it was this situation which has afforded a feeling of security to those who opposed vaccination and even prompted them to become more aggressive in their opposition to it.

"The department of health has repeatedly called attention to the fact that the mild type of the disease readily changes to the more fatal types. This is the kind which they are having now in Kansas City, the kind that is killing 33 per cent of those affected. In that city the death rate is running about 33 per cent; this is 33 deaths out of every 100 cases. Also several cases of the same malignant type have been reported from Dixon, Ill., and all traceable to the Kansas City outbreak.

"When smallpox assumed this dangerous character it would seem that ordinary prudence and common sense would prompt people to avail themselves of the safe and sure protection afforded by vaccination.

"It should be remembered that no one gets smallpox who is properly vaccinated. This has been proven by over a hundred years of experience and observation. Vaccination as now performed is a simple, harmless operation causing no pain and producing no ill effects. Kansas City is close enough to Chicago that with unre-

stricted communication between the two cities, the type of the disease prevalent there now becomes a distinct menace to the people of Chicago."

STERILIZATION OF MILK BY MEANS OF ELECTRICITY.

The following is quoted from the "Public Health Engineering Abstracts" of December 3, 1921:

"Municipal Milk Supply. A. Shelmerdine, Liverpool, England, Journal of State Medicine, Vol. 29, No. 10, October 1921, pp. 297–304.

"After considering the question of *milk supply in general*, in which he states that 'all milk for sale to the public should be free from pathogenic bacteria whether it is sold as market milk, cooking milk, or certified milk,' and that milk should be purified by municipalities and other sanitary authorities, Shelmerdine reviews the *experimental work at Liverpool some years ago* in sterilizing milk electrically, the apparatus consisting of a direct-current motor coupled to an alternating-current generator, a high tension transformer, together with a current transformer, switch gear, regulating devices and safety devices for the transformer and the sterilizing lethal tube.

"From the *results of tests* conducted at the time by Profs. Delepine, Ritchie, and Woodhead, the writer draws the following conclusions regarding the application of this method to milk conditions in England: (1) The electrical method of treating milk destroys the disease-producing bacteria which are found in it; (2) the main milk-souring bacteria are either completely destroyed, or, if some members of this class are left, they may be neglected, so far as the keeping power of the milk is concerned for ordinary household use; (3) the milk is not sterilized in the strictest sense of the word, but there is a reduction in the total number of bacteria by 99.93 per cent over a series of 15 daily examinations; (4) the milk will keep perfectly sweet for at least three or four days after treatment, and this period will cover distribution and use in all cases of household milk supplies; (5) the chemical constitution of the milk, so far as can be ascertained by chemical analysis, is unimpaired, and the taste is not in any way altered; (6) the milk is not only rendered nonpathogenic as regards ordinary bacteria, but in two cases in which the control supply was tuberculosis the electrically treated milk was nontuberculosis; (7) the milk after treatment is perfectly satisfactory as a food for infants.

"No information is given as to whether this method of purifying milk has proven successful in actual operation in any community.'

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.
Serial No. 142–1921.

MEH:ESK 129733(113).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 16 November, 1921.

To: All naval hospitals.
Subject: Inspection of naval hospitals by representatives of the U. S. Veterans' Bureau.
References: (*a*) U. S. Veterans' Bureau General Order No. 39, of October, 1921.
(*b*) U. S. Veterans' Bureau Field Order No. 23, of October 29, 1921.

1. The Director of the U. S. Veterans' Bureau is required by the Act of Congress approved August 9, 1921, to maintain a service of inspection. Section 9 ot this Act reads, in part, as follows:

"In order to standardize the character of examination, medical care, treatment, hospitalization, dispensary and convalescent care, nursing, vocational training, and such other services as may be necessary under this Act, the director shall maintain an inspection service, with authority to examine all facilities and services utilized in carrying out the purposes of this Act. * * *

2. The policy of the Veterans' Bureau in connection with the inspection of Governmental Institutions is stated in paragraph 14 of reference (a) and paragraph 3 of reference (b).

3. This bureau is advised that, in general, inspections in naval hospitals will be in the nature of consultations with commanding officers, on matters pertaining to the welfare of the beneficiaries of the Veterans' Bureau, but it is not within the power of this bureau to define the limits of such inspections.

4. It is desired that commanding officers co-operate as fully as possible with the inspecting officers of the Veterans' Bureau.

E. R. STITT.

Circular letter.
Serial No. 143–1921.

WRJ:THC 125884 (113).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 17 November, 1921.

To: All naval hospitals.
Subject: Stub requisitions and job orders.
Reference: (*a*) Bureau's circular letter No. 125935–2 of October 1, 1916.

1. While the bureau does not desire to curtail the use of stub requisitions for material necessary for the *ordinary* maintenance of

the hospital, it is compelled, due to the limited appropriations, to establish a quarterly allowance that shall not be exceeded without reference to the bureau.

2. An analysis of stub requisitions for the months of July, August, and September of this year shows a wide difference in expenditures at hospitals of similar capacity and number of patients.

3. It is directed that hospitals submit estimates of the amounts that will be required as *quarterly* allotments, for material required from navy yards, for ordinary maintenance of the hospitals. In the preparation of these estimates the minimum amounts that will be required, under each of the following headings, will be given. No effort will be made to include estimates for probable emergencies. (See par. 4.)

CONSTRUCTION AND REPAIR.

(*a*) Under this heading will be included all material, tools, etc., used for ordinary repairs to buildings, furnishings, plant appliances, etc.

(*b*) Estimates for alterations, construction, or extensive repairs will be referred to the bureau in each instance as outlined under "Job Orders."

(*c*) As a general guide, no material for a job, the cost of which is more than $25, will be included in this estimate.

CLEANING GEAR.

(*d*) All material used in cleaning wards, mess halls, etc., will be included in this estimate.

(*e*) The analysis of stub requisitions show a wide difference between the amounts used by hospitals of a similar type. It has been demonstrated by one hospital that by careful supervision of the issue and use of this class of material expenditures could be greatly reduced.

OFFICE SUPPLIES.

(*f*) Analysis of stub requisitions for material under this heading shows the greatest difference between hospitals doing practically the same amount of clerical work.

TRANSPORTATION SERVICE.

(*g*) Material, such as gasoline and oils, drawn from store for ambulances, trucks, or boats will be included under this heading.

(*h*) All expenditures for this class of material are a charge against the appropriataion "Contingent, M. & S.," a very small appropriation that is used for numerous purposes. Tires, spare parts, etc. (except gasoline and oil), when drawn from the navy

yard will be drawn under authority of the approved annual requisition; stubs will show on their face that the expenditure is a charge against such requisitions; the requisition will be debited with the amount of such stub as though the purchase had been made in the open market. If requests for additional allotments under the annual requisition are made, the amounts paid by public bills and amounts drawn on stub will be shown.

MESS GEAR, KITCHEN AND PANTRY UTENSILS.

(*i*) No estimates will be made under this heading.

(*j*) The requirements for kitchen utensils, table linen, and mess gear will be limited to the items listed in reference (*a*), and open-purchase requisitions for these articles will not be submitted.

(*k*) Requisitions will be made by letter and will be forwarded to the bureau for approval. After approval by the bureau, a stub requisition will be prepared in the usual manner.

(*l*) The needs of the hospitals will be anticipated semiannually, in January and July.

(*m*) Commanding officers should establish a strict system of accountability for articles of mess gear in order to prevent loss and breakage through carelessness.

MISCELLANEOUS.

(*n*) Estimates under this heading would include any material that could not be included under any of the above headings—i. e., such supplies as alcohol, paper towels, flash lights, etc.

JOB ORDERS.

(*o*) It has repeatedly been brought to the attention of the bureau that articles repaired at navy yards have been returned with a charge in excess of the original cost.

(*p*) Requests for job orders will, in every instance, be submitted to the bureau for approval, except in case of sudden emergency that will not permit the delay incident to such approval.

(*q*) In order that the bureau may act intelligently on requests for job orders, the following information will be furnished therewith in each case:

(*r*) Repairs, equipment—

(*s*) Date of receipt; invoice or appraised value.

(*t*) Present condition.

(*u*) Estimated cost of replacement.

(*v*) Estimated cost of repairs, navy yard, outside.

(*w*) If work can be performed by hospital force, give cost of material required.

(*x*) Recommendations.

(*y*) Alterations and repairs, buildings and grounds—

(*z*) Present condition.

(*aa*) All facts as to why the alterations or repairs are necessary; the purpose to be served, etc.

(*bb*) Estimated cost, navy yard, outside.

(*cc*) If work can be performed by hospital force, give cost of material required.

(*dd*) Recommendations.

(*ee*) The quantity of material drawn from the navy yard or purchased in the open market for the work shall be restricted in every instance to that which is actually needed for the job concerned.

(*ff*) The bureau desires, whenever the best interests of the Government will be served, to replace worn-out equipment rather than spend large amounts on repairs. Commanding officers are directed to carefully consider the most economical plan before submitting recommendations.

FUEL, ETC.

(*gg*) Estimates will not include fuel, water, gas, electricity, etc.

4. In sudden emergencies that will not permit the delay incident to approval by the bureau; material or services to care for the emergency may be required in the usual manner. The copy of the stub requisition forwarded to the bureau will show on its face the nature of the emergency for which the material or services were required.

5. When hospitals are supporting other activities, such as is the case at Washington and Norfolk, an explanation will be given when requesting unusually large allotments.

6. The bureau's approval of a survey recommending property "Fit for use when repaired on ship or station" will not be construed as authority to send the property to the navy yard for repairs. If it is desired to have this work performed by the navy yard, a request may accompany the survey; the request to be prepared as outlined under "Job orders."

7. Allotments will be made as liberal as the limited appropriation of the bureau permit, and commanding officers will so administer their commands as to not only prevent the exceeding of their allotments but also prevent the necessity for requesting additional allotments, except under very unusual circumstances.

8. Estimates required above will be submitted in duplicate and will be made separate from the accompanying letter.

E. R. Stitt.

Circular Letter.
Serial No. 144–1921.

MEH:ESK 129733 (114).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 5, 1921.

To: All naval hospitals.
Subject: Discharge of beneficiaries of the Veterans' Bureau.
Enclosure: Veterans' Bureau's letter, RWB/eus:10. November 23, 1921.

1. The attached letter from the Director of the Veterans' Bureau, together with its enclosure, is forwarded for your information and guidance.

E. R. STITT.

129733 (114)

TREASURY DEPARTMENT,
Washington, November 23, 1921.

In reply refer to:
RWB/eus:10
Hospital section.

THE SURGEON GENERAL, U. S. NAVY,
Washington, D. C.

SIR: Our records tend to show that in spite of our desire to use Government hospital beds we are using contract hospital beds in about the same proportion as heretofore.

It is possible that our patients in Government hospitals are not being discharged when they have no further need of hospitalization.

It is requested that you refer to paragraph 2 of Veterans' Bureau General Order No. 26, dated September 6, 1921, and our letter to the district managers, dated October 15, 1921, a copy of which is inclosed, and that you request your various officers in charge of hospitals to cooperate as far as possible with the spirit of our orders.

This office realizes that in many instances a delay in the actual discharge of patients from hospitals may be occasioned in our district offices.

Such help as you may be able to give this matter will be appreciated.

Respectfully,

C. R. FORBES,
Director, U. S. Veterans' Bureau.

Inclosure (1).

74993—21——14

COPY.

RUP–vef–10.
October 15, 1921.

129733 (114).
District Manager, District No. 1,
U. S. Veterans' Bureau,
Washington–Essex Building, Boston, Mass.

Dear Sir: Referring to General Order No. 26 and to Paragraph No. 2, which reads as follows:

"All patients now in hospitals in your district who do not require further hospital treatment will be given four days' notice to make their personal arrangements and will then promptly be discharged from hospital. Each patient discharged under existing regulations will be furnished transportation to his bona fide legal residence in the United States or to the place from which he was hospitalized. Notification of such discharge will be sent immediately by the officer in charge of the institution caring for beneficiaries of the U. S. Veterans' Bureau to the district manager of the district in which the institution is located."

COPY.

129733(114).
October 15, 1921.

District Manager, District No. 1.

In complying with these instructions and before authorizing discharge of patients of the U. S. Veterans' Bureau from hospitals, district managers will determine:

(1) Whether the patient is in need of out-patient treatment in a dispensary or convalescent care. If so, district managers will make necessary arrangements to continue the treatment indicated after discharge of the patient from the hospital.

(2) Whether the patient desires vocational training. If so, his eligibility and feasibility will be determined and arrangements made for placing him in training promptly upon his discharge from the hospital.

(3) Necessary adjustment or readjustment of all matters pertaining to his compensation will also be completed promptly upon his discharge from the hospital.

In order to accomplish the above, patients of the U. S. Veterans Bureau will not be discharged from hospitals until district managers or their local representatives have been notified and the necessary arrangements made by them for determining the above factors, and upon which the district managers or their representatives will approve discharges and notify the hospital authorities accordingly.

Whenever it becomes necessary, in order to expedite the action desired, district managers should delegate authority to representative

iving or stationed in the neighborhood of the hospitals concerned. The discharge of patients, when further hospital treatment is no onger necessary, must not be delayed unnecessarily by representatives of the bureau.

Instructions contained in this communication do not apply to the provisions of General Order No. 27, regarding the discharge of patients for disciplinary reasons.

To make this effective, letters have been sent to the heads of all the governmental medical services caring for beneficiaries of this bureau, requesting their cooperation and that they issue the necessary orders to medical officers in charge of the hospitals of their respective services.

The provisions of this letter will be confirmed by a general order as soon as the same can be prepared.

Very truly, yours,

ROBT. U. PATTERSON,
Assistant Director, U. S. Veterans' Bureau.

Circular letter.
Serial No. 145–1921.

SDS: WHM

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 6 December, 1921.

To: Medical officers in command, all hospitals.
Subject: Abbreviation to be used in reporting U. S. Veterans' Bureau patients on statistical reports.

1. It is directed that the abbreviation "VBP" be used in reporting U. S. Veterans' Bureau patients on statistical returns to this bureau (forms I and F).

E. R. STITT.

Circular letter.
Serial No. 146–1921.

WSG/T 129733(104).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 6, 1921.

To: All naval hospitals.
Subject: Transportation of beneficiaries and claimants of the Veterans' Bureau.
Reference: Veterans' Bureau 2d endorsement, RWB/jat: 10, hospital section, November 14, 1921.

1. The following statement was made (reference) in reply to an inquiry from this bureau, and is communicated for the further information of all naval hospitals:

"1. An opinion from our general counsel this date states that beneficiaries of the U. S. Veterans' Bureau who are discharged from hospital on completion of treatment are entitled to transportation to their homes. This transportation is authorized whether or not they have been furnished mileage by the Army or Navy upon their discharge.

/s/ Robt. U. Patterson,
Assistant Director, U. S. Veterans' Bureau."

2. It is desired that this information be made familiar to all members of the staff, and to the beneficiaries concerned.

E. R. Stitt.

Circular letter.
Serial No. 147–1921.

WSG/T 125330(113).

Department of the Navy,
Bureau of Medicine and Surgery,
Washington, D. C., December 6, 1921.

To: All naval hospitals and naval medical supply depots.
Subject: Use of Government vehicles.

1. The following quoted letter from the chief coordinator has been sent to the heads of all Executive Departments:

"Statute L, vol. 33, sec. 4, February 3, 1905, forbids the use of Government vehicles for private purposes.

"There has been observed in the City of Washington a large amount of improper use of Government motor vehicles, in most cases passenger cars which are assigned to officials and officers for official use.

"Ladies who are not employees of the Government use official cars for marketing purposes and for making personal social calls while other Government cars have been seen at football games, theaters, etc.

"It is readily apparent that such use of Government automobiles, involving heavy expenditure of public funds, must be discontinued.

"It is requested that this matter be brought to the attention of all officials, officers, and employees of your department to the end that further use of Government motor transportation for private purposes shall cease.

"The local motor transport coordinator has been directed to report all instances of violation of the above-mentioned statute and each case will be dealt with as the facts may warrant.

/s/ "H. C. SMITHER,
"*Chief Coordinator, General Supply.*"

2. It is directed that this letter be brought to the attention of all ficers.

E. R. STITT.

VITAL STATISTICS.

Annual rates, shown in the succeeding statistical tables, are obined as follows:

The total number of admissions to the sick list or the number of eaths reported during the period indicated is multiplied by $\frac{3}{2}\frac{6}{8}\frac{5}{5}$ or 12, depending upon whether the period includes 4 or 5 weeks r a calendar month. The product is then multiplied by 1,000 and ivided by the average complement.

Where no figures appear in a given column, it may be taken for ranted that the disease did not occur or, if in reference to hospitals, at no case was admitted.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service.*

ATLANTIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
1921										
nth ended Oct. 31...	13	2,714	147	649.96	137	605.75	10	44.22	89	393.52
nth ended Nov. 30..	167	23,563	757	385.52	681	346.81	76	38.71	229	116.62
Average of the rates.....	.....	.....	.....	517.74	.....	476.28	.....	41.66	.....	255.07

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

Communicable diseases were reported as follows:

ATLANTIC FLEET—continued.

	Measles.	Mumps.	Pneumonia.	Tuberculosis, chronic pulmonary.	Influenza.
Month ended Nov. 30:					
U. S. S. Delaware					1
U. S. S. Wyoming		1	2		4
U. S. S. South Carolina					1
U. S. S. North Dakota				1	
U. S. S. Bridgeport			1		2
U. S. S. Columbia					2
U. S. S. Cormorant					2
U. S. S. Graham		1	1		
U. S. S. Preble					1
U. S. S. Reid	1				
U. S. S. Rochester	1				
U. S. S. St. Louis			3	2	1
U. S. S. Taylor					1
U. S. S. William B. Preston					1

PACIFIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
1921.										
Month ended Oct. 31	22	2,039	54	317.80	43	253.07	11	64.74	22	129.46
Month ended Nov. 30	133	19,267	604	376.19	564	351.27	40	24.91	187	116.47
Average of the rates				346.99		302.17		44.82		122.96

Communicable diseases were reported as follows:

	Malaria.	Pneumonia.	Tuberculosis, chronic pulmonary.	Influenza
Month ended Oct. 31:				
U. S. S. Buffalo		1	1	
U. S. S. Burns				
U. S. S. Sproston	1			
Month ended Nov. 30:				
U. S. S. California				
U. S. S. Idaho		1		
U. S. S. Pennsylvania			1	
U. S. S. Texas	2			
U. S. S. Arizona		1		
U. S. S. Breese				
U. S. S. Camden		1		
U. S. S. Jacob Jones				
U. S. S. Melville		1		
U. S. S. Prairie				
U. S. S. Tattnall				
U. S. S. Vestral		1		

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

MARINES ON FOREIGN SHORE SERVICE.

	Number of reports received.	Complement.	Admissions, communicable disease, exclusive of venereal disease.	Annual rate per 1,000.
Month ended Oct. 31, 1921	14	5,839	360	739.85

Communicable diseases were reported as follows:

	Malaria.	Dengue.	Pneumonia.	Influenza.	Tuberculosis, chronic pulmonary.	Dysentery.
Field hospital, Fifteenth Regiment, Second Brigade, United States Marine Corps, San Pedro de Marcoris, Santo Domingo, Dominican Republic	4					
All outposts, San Pedro de Marcoris, Santo Domingo, Dominican Republic	12		1			
Field hospital, Second Brigade, Santo Domingo City, Dominican Republic	12	33				
Fourth Regiment, United States Marine Corps, Santo Domingo City, Dominican Republic	6	15				1
United States Marine Barracks, Azua, Dominican Republic	5	1				
United States Marine Barracks Training Center, Santo Domingo City, Dominican Republic	5	4				
United States Marine Aviation Force, Santo Domingo, Dominican Republic	3	1				
First Brigade, Eighth Regiment, Port au Prince, Haiti[1]	193	19			3	
Haitian gendarmerie, United States Marine Corps, Port au Prince, Haiti	1	1		1		
Marine Barracks, St. Croix, Virgin Islands		9				
Marine Barracks, St. Thomas, Virgin Islands		19				
Marine detachment, Camaguey, Cuba	2			1		
Marine detachment, Managua, Nicaragua					1	1
Marine detachment, Peking, China				1		
Naval and Marine Corps graves registration service, Paris, France						

[1] Individual organizations not reported.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. Marines on foreign shore service, October, 1921.*

ATLANTIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. North Dakota	1,150	3	31.30	36.67
U. S. S. Delaware	1,130	3	31.85	47.26
U. S. S. Arkansas	1,214	3	29.65	82.71
U. S. S. Wyoming	1,380	10	86.95	117.31
U. S. S. Texas	1,129	5	53.14	126.56
U. S. S. Galveston	289	7	290,65	136.59
U. S. S. Kansas	352	5	170.45	138.69
U. S. S. Florida	1,112	5	53.95	146.87
U. S. S. New York	1,163	8	82.54	163.12
U. S. S. Connecticut	569	6	107.62	167.32
U. S. S. South Carolina	387	3	93.02	168.56
U. S. S. Utah	1,063	44	496.70	171.21
U. S. S. Michigan	330	4	145.45	171.24
U. S. S. Minnesota	449	2	53.45	175.38
U. S. S. Sacramento	161	4	298.13	179.48
U. S. S. Cleveland	317	7	264.98	218.25
U. S. S. Denver	335	3	107.46	229.37
U. S. S. Dolphin	164	2	146.34	263.35
U. S. S. Tacoma	298	2	80.53	312.96
U. S. S. Asheville	177	4	271.18	322.62
U. S. S. Niagara	211	5	284.36	334.49
U. S. S. St. Louis	354	29	628.15	529.63
Destroyer force.[1]				
U. S. S. Rowan	50	1	240.00	27.77
U. S. S. Barney	98	1	122.44	31.25
U. S. S. Worden	61	1	196.72	32.87
U. S. S. Blakely	100	1	120.00	35.29
U. S. S. Connor	50	1	240.00	35.71
U. S. S. Cassin	56	1	214.28	47.71
U. S. S. Meredith	54	1	222.22	63.32
U. S. S. Foote	54	1	222.22	64.51
U. S. S. Dyer	57	2	421.05	67.41
U. S. S. Gridley	57	1	210.52	67.66
U. S. S. Pope	68	2	352.94	71.85
U. S. S. Shaw	48	1	250.00	80.17
U. S. S. Wadsworth	58	1	206.89	80.26
U. S. S. Dickerson	103	1	116.50	81.56
U. S. S. Hopkins	59	1	203.38	82.75
U. S. S. Goldsborough	97	1	123.71	86.79
U. S. S. Rochester	500	2	48.00	87.88
U. S. S. Cummings	60	1	200.00	89.10
U. S. S. Gwin	54	1	222.22	93.93
U. S. S. Ericsson	56	1	214.28	94.24
U. S. S. Thomas	56	1	214.28	96.19
U. S. S. Bridgeport	751	9	143.80	100.25
U. S. S. Dixie	617	5	97.24	107.81
U. S. S. Black Hawk	426	2	56.33	108.42
U. S. S. Barry	57	1	210.52	109.42
U. S. S. Haraden	53	1	226.41	117.64
U. S. S. Preble	100	2	240.00	120.60
U. S. S. Balch	56	2	428.57	126.98
U. S. S. Leonidas	257	2	93.38	131.97
U. S. S. Gregory	56	2	428.57	132.11
U. S. S. J. F. Talbot	57	4	842.10	134.83
U. S. S. Converse	77	1	155.84	137.25
U. S. S. Cowell	54	1	222.22	137.40
U. S. S. Conyngham	54	3	666.66	142.29
U. S. S. Wilkes	45	4	1,066.66	146.31
U. S. S. Cole	66	4	727.27	160.26
U. S. S. Stringham	62	1	193.54	177.51
U. S. S. Biddle	57	1	210.52	178.34
U. S. S. Reid	93	2	258.06	181.81
U. S. S. Bagley	60	3	600.00	215.93
U. S. S. Dallas	60	3	600.00	225.00
U. S. S. Isherwood	69	4	695.65	230.76
U. S. S. Pillsbury	75	1	160.00	236.22
U. S. S. Abel P. Upshur	81	1	148.14	266.66
U. S. S. Fairfax	57	1	210.52	282.60
U. S. S. Caldwell	56	3	642.85	333.33
U. S. S. Satterlee	96	1	125.00	348.42
U. S. S. Overton	120	1	100.00	360.97
U. S. S. Gilmer	95	1	126.31	568.04

[1] Destroyers not listed, no disease, or no report received for this month.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. marines on foreign shore service, October, 1921*—Con.

ATLANTIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Destroyer force—Continued.				
U. S. S. Childs	124	5	483.87	634.92
U. S. S. McFarland	127	4	377.95	758.68
U. S. S. Sands	127	8	755.90	763.28
Miscellaneous.				
U. S. S. Contocook	48	.....	.....	.....
U. S. S. Woodcock	48	.....	.....	.....
U. S. S. Nokomis	(2)	.....	.....	.....
U. S. S. Swan	54	.....	.....	48.78
U. S. S. Mahanna	(2)	.....	.....	60.45
U. S. S. Culgoa	153	2	156.86	61.46
U. S. S. Quail	50	1	240.00	62.39
U. S. S. Mallard	54	1	222.22	65.21
U. S. S. Maumee	129	.....	.....	65.57
U. S. S. Savannah	654	9	165.13	67.86
U. S. S. Mayflower	198	3	181.81	68.25
U. S. S. Sandpiper	75	.....	.....	71.21
U. S. S. Hartford	583	3	61.74	73.84
U. S. S. Relief	414	1	28.98	78.32
U. S. S. Columbia	728	4	65.93	79.86
U. S. S. Lebanon	81	1	148.14	79.91
U. S. S. Red Wing	65	.....	.....	96.61
U. S. S. Murray	103	1	116.50	102.40
U. S. S. Bushnell	313	1	38.33	107.21
U. S. S. Harding	53	.....	.....	107.86
U. S. S. Bridge	214	2	112.14	108.87
U. S. S. Pecos	119	1	100.84	110.76
U. S. S. San Francisco	301	4	159.46	111.66
U. S. S. Owl	62	.....	.....	112.94
U. S. S. Proteus	140	.....	.....	113.86
U. S. S. Chewink	45	.....	.....	116.95
U. S. S. Brazos	124	1	96.77	120.00
U. S. S. Shawmut	312	2	76.92	120.67
U. S. S. Hannibal	146	3	246.57	126.81
U. S. S. Patapsco	34	.....	.....	130.71
U. S. S. Lark	55	3	654.54	132.70
U. S. S. Mahan	102	2	235.29	134.72
U. S. S. Reina Mercedes	844	3	42.65	142.97
U. S. S. Prometheus	360	4	133.33	144.09
U. S. S. Algorma	39	1	307.69	153.84
U. S. S. Rail	49	.....	.....	157.89
U. S. S. Bobolink	50	.....	.....	158.49
U. S. S. Teal	49	1	244.89	167.83
U. S. S. Beaver	530	14	316.98	169.01
U. S. S. Sciota	28	.....	.....	174.92
U. S. S. Eagel No. 17	(2)	.....	.....	176.77
U. S. S. Iuka	43	1	279.06	188.08
U. S. S. Carrabassett	45	.....	.....	190.90
U. S. S. Robin	54	.....	.....	194.44
U. S. S. Lansdale	93	.....	.....	195.43
U. S. S. Montcalm	42	.....	.....	200.00
U. S. S. Vireo	54	1	222.22	235.00
U. S. S. Vixen	77	1	155.84	240.96
U. S. S. Nereus	143	1	83.91	265.15
U. S. S. Olympia	475	10	252.63	284.90
U. S. S. Scorpion	134	6	537.31	337.38

PACIFIC FLEET.

Battleship and cruiser force.				
U. S. S. Oklahoma	1,064	4	45.11	66.82
U. S. S. Nevada	1,093	4	43.91	70.00
U. S. S. Arizona	1,164	6	61.85	72.19
U. S. S. Pennsylvania	1,278	17	159.62	104.42
U. S. S. Tennessee	1,218	18	177.33	106.44
U. S. S. California	1,519	7	55.29	123.73
U. S. S. New Mexico	1,294	9	83.46	126.87
U. S. S. Mississippi	1,127	4	42.59	135.85
U. S. S. Idaho	1,128	5	53.19	142.73
U. S. S. Maryland	1,426	11	92.56	151.38

(2) No report received for October.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. marines on foreign shore service, October, 1921*—Con.

PACIFIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Destroyer force.[1]				
U. S. S. Claxton	68	1	176.47	20.19
U. S. S. Schley	58	1	206.89	21.77
U. S. S. Hazelwood	39	1	307.69	25.05
U. S. S. Charleston	505	1	23.76	27.29
U. S. S. Marcus	91	1	131.86	31.33
U. S. S. Hull	112	1	107.14	40.13
U. S. S. Ramsay	63	1	190.47	42.45
U. S. S. Sloat	83	2	289.15	43.87
U. S. S. Chauncey	71	2	338.02	47.71
U. S. S. Sinclair	60	1	200.00	55.29
U. S. S. Radford	71	1	169.01	59.85
U. S. S. Chase	95	1	126.31	60.75
U. S. S. Robert Smith	107	2	224.29	61.53
U. S. S. Meyer	51	1	235.29	62.90
U. S. S. Melvin	106	1	113.20	65.93
U. S. S. Mullany	104	2	230.76	68.37
U. S. S. Prairie	443	2	54.17	68.89
U. S. S. Stansbury	96	1	125.00	71.68
U. S. S. Twiggs	81	1	148.14	71.71
U. S. S. Hogan	85	1	141.17	75.66
U. S. S. Renshaw	87	1	137.93	75.94
U. S. S. Champlin	34	3	1,058.82	76.43
U. S. S. MacKenzie	97	1	123.71	80.62
U. S. S. Simpson	57	2	421.05	80.92
U. S. S. Breese	64	1	187.50	84.60
U. S. S. Reno	61	1	196.72	88.47
U. S. S. Boggs	63	1	190.47	91.13
U. S. S. Sumner	32	1	375.00	91.60
U. S. S. Melville	389	1	30.84	92.37
U. S. S. Zeilen	47	1	255.31	92.71
U. S. S. La Vallette	102	2	235.29	106.98
U. S. S. McCawley	45	1	266.66	107.62
U. S. S. Mervine	107	2	224.29	110.34
U. S. S. Montgomery	60	1	200.00	118.81
U. S. S. Evans	58	1	206.89	126.07
U. S. S. Buffalo	402	7	208.95	127.47
U. S. S. Paul Hamilton	57	1	210.52	135.97
U. S. S. Henshaw	49	3	734.69	152.11
U. S. S. Birmingham	315	4	152.38	157.03
U. S. S. Elliott	82	1	146.34	159.07
U. S. S. Farquhar	64	1	187.50	181.13
U. S. S. Corry	113	5	530.97	188.48
U. S. S. Delphy	68	3	529.41	212.38
U. S. S. Jacob Jones	81	1	148.14	214.28
U. S. S. Stoddert	64	1	187.50	230.76
U. S. S. Tarbell	71	1	169.01	264.79
U. S. S. Lea	55	1	218.18	317.88
U. S. S. Greer	63	2	380.95	337.26
U. S. S. Upshur	60	4	800.00	434.69
Miscellaneous.				
U. S. S. Eider	(2)			
U. S. S. Lapwing	54			
U. S. S. Navajo	(2)			
U. S. S. Seagull	60			
U. S. S. Tern	53			30.0
U. S. S. Burns	104			38.1
U. S. S. Anthony	101	2	237.62	44.2
U. S. S. Cuyama	101	1	118.81	50.6
U. S. S. Ludlow	101	3	356.43	77.1
U. S. S. Whippoorwill	28	1	428.57	79.4
U. S. S. Ingraham	104	2	230.76	79.7
U. S. S. Baltimore	363	1	33.05	79.8
U. S. S. Tanager	57			84.9
U. S. S. Stribling	105	1	114.28	88.1
U. S. S. Vestal	377	2	63.66	91.7
U. S. S. Brant	44	1	272.72	97.5
U. S. S. Nanshan	153	2	156.86	97.9
U. S. S. Kingfisher	47			98.7
U. S. S. Neptune	174	2	137.93	102.0

[1] Destroyers not listed, no disease, or no report received for this month.
[2] No report received for October.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. marines on foreign shore service, October, 1921*—Con.

PACIFIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Miscellaneous—Continued.				
U. S. S. Pinola	52			109.68
U. S. S. Rappahannock	263	3	136.88	116.33
U. S. S. Aroostook	317	2	75.70	116.38
U. S. S. Kanawha	118			120.77
U. S. S. Cardinal	46			122.44
U. S. S. Glacier	155			127.50
U. S. S. Turkey	[2]			132.45
U. S. S. Eagle No. 11	38			135.08
U. S. S. Sproston	101			150.37
U. S. S. Camden	620	9	174.19	162.73
U. S. S. Jason	141	6	510.63	165.35
U. S. S. Sonoma	56	2	428.57	166.37
U. S. S. Penguin	54	1	222.22	167.83
U. S. S. Pelican	[2]			189.97
U. S. S. Mercy	285	1	42.10	193.37
U. S. S. Rainbow	508	5	118.11	195.00
U. S. S. Frederick	480	3	75.00	202.22
U. S. S. Gannet	58			235.29
U. S. S. Thrush	51	1	235.29	250.00
U. S. S. Hancock	130	1	92.30	258.24
U. S. S. Swallow	47			583.12

ASIATIC FLEET.

Battleship and cruiser force.				
U. S. S. Huron	[2]			336.36
U. S. S. Albany	272	5	220.58	339.11
U. S. S. New Orleans	[2]			645.79
Destroyer Force.[1]				
U. S. S. Alden	94	2	255.31	444.44
U. S. S. Zane	120	10	1,000.00	499.13
Miscellaneous.				
U. S. S. Heron	[2]			
U. S. S. Mohican	[2]			
U. S. S. Piscataqua	[2]			39.21
U. S. S. Avocet	[2]			41.66
U. S. S. General Alava	64			50.49
U. S. S. Celtic	[2]			67.27
U. S. S. Wompatuck	39	1	307.69	88.23
U. S. S. Ontario	73	1	164.38	119.60
U. S. S. Abarenda	[2]			127.65
U. S. S. Sara Thompson	[2]			205.53
U. S. S. R. L. Barnes	[2]			265.92
U. S. S. Bittern	[2]			310.34
U. S. S. Villalobos	[2]			334.57
U. S. S. Quiros	50	3	720.00	352.25
U. S. S. Rizal	117	2	205.12	386.45
U. S. S. Genesee	[2]			417.63
U. S. S. Elcano	[2]			428.04
U. S. S. Isabel	113	2	212.38	474.16
U. S. S. Palos	[2]			484.30
U. S. S. Hart	[2]			606.45
U. S. S. Napa	[2]			635.76
U. S. S. Wilmington	230	14	730.43	642.00
U. S. S. Monocacy	[2]			668.28
U. S. S. Pampanga	36			693.64

[1] Destroyers not listed, no disease, or no report received for this month.
[2] No report received for October.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. marines on foreign shore service, October, 1921*—Con.

UNASSIGNED, INCLUDING SHIPS ON SPECIAL DUTY.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. Ohio	333	4	144.14	142.90
Miscellaneous.				
U. S. S. Pyro	306			74.07
U. S. S. Gulfport	106	1	113.20	74.38
U. S. S. Nitro	226			84.82
U. S. S. Caesar	91			92.40
U. S. S. Falcon	80			94.78
U. S. S. Houston	114			106.41
U. S. S. Quincy	104			118.66
U. S. S. Kittery	120			121.45
U. S. S. Cormorant	63	3	571.42	127.65
U. S. S. Newport News	124	3	290.32	144.65
U. S. S. Pensacola	(2)			148.79
U. S. S. Bath	131	3	274.80	158.34
U. S. S. Patoka	109			176.12
U. S. S. Henderson	549	9	196.72	193.64
U. S. S. Orion	183	1	65.57	200.80
U. S. S. Neches	117	1	102.56	217.86
U. S. S. Ramapo	126	5	476.19	237.19
U. S. S. Sapelo	100			240.91
U. S. S. Alameda	92			251.30
U. S. S. Grebe	50			263.73
U. S. S. Saturn	117	4	410.25	283.15
U. S. S. Trinity	169	8	568.04	292.44
U. S. S. Mars	149	5	402.68	431.23

UNITED STATES MARINES ON FOREIGN SHORE SERVICE.

Eighth Regiment, First Provisional Brigade, Mirebalais, Haiti	(2)			228.27
Fourth Air Squadron, Port au Prince, Haiti	(2)			359.67
Second Regiment, First Brigade, United States Marine Corps, Cape Haitien, Haiti	788	12	182.74	370.19
First Provisional, Brigade, United States Marine Corps, Port au Prince, Haiti	2,286	61	320.20	513.60
First Air Squadron, Santo Domingo, Dominican Republic	196	3	183.67	70.46
United States Marine Barracks Training Center, Santo Domingo, Dominican Republic	138	2	173.91	107.99
Fifteenth Regiment, 2d Brigade, San Pedro de Macoris, Dominican Republic	858	5	69.93	141.43
Fourth Regiment, United States Marine Corps, Santo Domingo, Dominican Republic	(2)			213.01
Post Dispensary, Marine Barracks, St. Thomas, Virgin Islands	231	3	155.84	124.92
Naval and Marine Corps Graves Registration Service, Paris	(2)			55.55
United States Marine detachment, Camaguey, Cuba	306	3	117.64	206.17
United States Marine detachment, American Legation, Managua, Nicaragua	121	3	297.52	357.0[illegible]
United States Marine detachment, American legation, Peking, China	350	15	514.28	432.2[illegible]

[2] No report received for October.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. marines on foreign shore service, October, 1921*—Con.

SUMMARY.

	Annual rate per 1,000, October.			Average rate since Jan. 1, 1921.		
	Maximum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	0	121.69	1,066.66	0	152.73	1,023.36
Battleship and cruiser force:						
Atlantic Fleet	31.30	140.23	628.15	36.67	165.88	529.63
Pacific Fleet	42.59	82.85	177.33	66.82	134.26	151.38
Asiatic Fleet	220.58	220.58	220.58	336.36	353.63	645.79
Unassigned, including ships on special duty	144.14	144.14	144.14	142.90	188.90	142.90
Destroyer force:						
Atlantic Fleet	0	117.36	1,066.66	0	160.25	1,023.36
Pacific Fleet	0	104.66	1,058.82	0	83.76	434.69
Asiatic Fleet	255.31	672.89	1,000.00	108.84	419.75	664.07
Miscellaneous:						
Atlantic Fleet	0	122.62	654.54	0	121.81	337.38
Pacific Fleet	0	112.51	510.63	0	126.47	583.12
Asiatic Fleet	0	382.27	730.00	0	322.60	693.64
Unassigned, including ships on special duty	0	159.95	571.42	74.07	167.71	431.23

RATIO OF SYPHILIS AND GONOCOCCUS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, October.		Per cent since Jan. 1, 1921.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	75.11	6.90	62.82	8.52
Battleship and cruiser force:				
Atlantic Fleet	70.12	6.10	57.45	9.22
Pacific Fleet	83.53	9.41	68.71	6.86
Asiatic Fleet	40.00	20.00	46.52	14.68
Unassigned, including ships on special duty	75.00	0	57.94	16.82
Destroyer force:				
Atlantic Fleet	81.31	6.54	68.88	7.38
Pacific Fleet	80.00	7.50	77.20	6.40
Asiatic Fleet	75.00	0	45.67	8.82
Miscellaneous:				
Atlantic Fleet	79.35	3.26	66.75	8.25
Pacific Fleet	75.00	3.85	65.98	7.28
Asiatic Fleet	43.48	17.39	53.06	10.66
Unassigned, including ships on special duty	65.12	11.63	63.98	9.53

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the four-week period, Nov. 6 to Dec. 3, 1921, inclusive.*

VENEREAL DISEASES.

	Total admissions.	Annual rate per 1,000.	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000.
FIRST NAVAL DISTRICT.									
Boston, Mass., navy yard	4	99.61	19.11	.....	.....	3	74.71	1	24.90
Hingham, Mass., receiving ship and ammunition depot	4	86.52	92.56	.....	.....	3	64.89	1	21.63
Newport, R. I.:									
Naval torpedo station	2	29.21	23.77	1	14.60	1	14.60	.....	.....
Naval training station	0	.....	12.21	.....	.....	.....	.....	.....	.....
Portsmouth, N. H., navy yard, including naval prison	4	34.12	7.82	.....	.....	3	25.59	1	8.53
THIRD NAVAL DISTRICT.									
Brooklyn, N. Y.:									
Headquarters, naval district	1	20.50	3.25	.....	.....	1	20.50	.....	.....
Navy yard, including marine barracks	3	89.44	32.00	.....	.....	3	89.44	.....	.....
Receiving ship (Bay Ridge)	13	105.62	47.50	.....	.....	12	97.50	1	8.12
New London, Conn., naval submarine base	5	55.55	22.77	1	11.11	3	33.33	1	11.11
FOURTH NAVAL DISTRICT.									
Philadelphia, Pa.:									
Navy yard	2	79.26	26.99	.....	.....	2	79.26	.....	.....
Receiving station	21	191.56	82.34	6	54.73	12	109.46	3	27.36
FIFTH NAVAL DISTRICT.									
Hampton Roads, Va.:									
Naval air station, naval operating base	9	96.83	46.04	4	48.41	5	60.52	.....	.....
Naval training station	4	12.16	15.10	.....	.....	4	12.16	.....	.....
Receiving ship at naval base section	12	207.99	91.39	1	17.33	11	190.66	.....	.....
Norfolk, Va., navy yard, including marine barracks	4	87.83	23.43	1	21.95	2	43.91	1	21.95
Quantico, Va., marine barracks	11	45.62	26.60	.....	.....	7	29.03	4	16.59
SIXTH NAVAL DISTRICT.									
Charleston, S. C.:									
Navy yard and marine barracks	1	48.14	12.22	.....	.....	.....	.....	1	48.14
Receiving ship	12	264.44	89.18	4	88.13	7	154.23	1	22.03
Parris Island, S. C., marine barracks	7	42.30	14.78	.....	.....	7	42.30	.....	.....
SEVENTH NAVAL DISTRICT.									
Key West, Fla., naval station	0	.....	14.76	.....	.....	.....	.....	.....	.....
EIGHTH NAVAL DISTRICT.									
New Orleans, La., naval station	4	354.66	71.75	1	88.66	3	265.99	.....	.....
Pensacola, Fla., naval air station	9	122.63	62.41	1	13.62	7	95.38	1	13.62
NINTH NAVAL DISTRICT.									
Great Lakes, Ill., naval training station	28	135.51	30.71	.....	.....	26	125.45	2	9.65
ELEVENTH NAVAL DISTRICT.									
San Diego, Calif., naval air station	3	31.35	12.58	.....	.....	3	31.35	.....	.....
San Pedro, Calif., naval submarine base	6	63.15	42.74	.....	.....	5	52.63	1	10.53
TWELFTH NAVAL DISTRICT.									
Mare Island, Calif., naval station	17	123.95	30.36	4	30.98	12	92.96	1	7.77
San Francisco, Calif., naval training station	8	49.28	28.76	.....	.....	6	36.96	2	12.32

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the four-week period, Nov. 6 to Dec. 3, 1921, inclusive*—Continued.

VENEREAL DISEASES—continued.

	Total admissions.	Annual rate per 1,000.	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual per per 1,000.
IRTEENTH NAVAL DISTRICT.									
eyport, Wash., naval torpedo station	1	63.10	49.35	.....	.....	1	63.10	.....	.....
uget Sound, Bremerton, Wash.:									
Navy yard, including marine barracks	1	28.63	5.56	.....	.....	1	28.63	.....	.....
Receiving ship	1	62.50	60.80	1	62.50	.....	.....	.....	.....
Total	197	76.98	34.77	25	9.77	150	58.62	22	8.59

TABLE No. 4.—*Admissions to sick list and admission rates, for shore stations for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

DISEASES AND INJURIES.

	Complement.	Total admissions, all causes.	Annual rate per 1,000.	Average rate since July 1.	Total admissions, communicable diseases, exclusive of influenza.	Annual rate per 1,000.	Average rate since July 1.
FIRST NAVAL DISTRICT.							
oston, Mass., navy yard	522	14	348.65	186.86	0	.....	2.12
ingham, Mass., receiving ship and ammunition depot	601	31	670.53	524.53	0	.....	0
ewport, R. I.:							
Naval torpedo station	890	25	350.54	145.86	0	.....	3.24
Naval station	384	15	507.81	378.51	0	.....	12.21
ortsmouth, N. H., navy yard, including naval prison	1,524	35	298.55	98.89	0	.....	1.42
THIRD NAVAL DISTRICT.							
rooklyn, N. Y.:							
Headquarters of naval district	634	10	205.04	36.87	0	.....	0
Navy yard, including marine barracks	436	16	477.05	171.14	0	.....	0
Receiving ship	1,600	112	910.00	434.98	1	8.12	4.45
ew London, Conn., naval submarine base	1,170	44	488.88	347.49	1	11.11	1.98
FOURTH NAVAL DISTRICT.							
hiladelphia, Pa.:							
Navy yard	328	8	277.43	175.44	0	.....	0
Receiving station	1,425	90	820.98	274.96	0	.....	2.94
FIFTH NAVAL DISTRICT.							
ampton Roads, Va.:							
Naval air station	1,074	34	411.53	238.40	0	.....	5.11
Naval training station	4,273	199	605.48	147.49	2	6.08	5.78
Receiving ship at naval base	750	43	745.31	434.52	1	17.33	8.01
orfolk, Va., navy yard and marine barracks	592	15	329.38	115.40	0	.....	5.02
antico, Va	3,134	121	501.90	249.61	2	8.29	16.73
SIXTH NAVAL DISTRICT.							
arleston, S. C.:							
Navy yard and marine barracks	270	2	96.29	73.33	0	.....	0
Receiving ship	590	50	1,101.70	227.01	5	110.17	24.32
rris Island, S. C., marine barracks	2,151	23	139.00	70.22	0	.....	.52
SEVENTH NAVAL DISTRICT.							
y West, Fla	129	8	806.20	494.59	0	.....	0

TABLE No. 4.—*Admissions to sick list and admission rates, for shore stations for the four-week period Nov. 6 to Dec. 3, 1921, inclusive*—Continued.

DISEASES AND INJURIES—continued.

	Complement.	Total admissions, all causes.	Annual rate per 1,000.	Average rate since July 1.	Total admissions, communicable diseases, exclusive of influenza.	Annual rate per 1,000.	Average rate since July 1.
EIGHTH NAVAL DISTRICT.							
New Orleans, La., naval station	150	9	797.99	351.95	0	.....	58.08
Pensacola, Fla., naval air station	954	39	531.41	294.25	0	.....	7.80
NINTH NAVAL DISTRICT.							
Great Lakes, Ill., naval training station	2,694	110	530.75	263.42	0	.....	33.45
ELEVENTH NAVAL DISTRICT.							
San Diego, Calif., naval air station	1,244	47	491.15	203.98	0	.....	.89
San Pedro, Calif., naval submarine base	1,085	21	221.04	152.29	0	.....	6.23
TWELFTH NAVAL DISTRICT.							
Mare Island, Calif., naval station	1,678	62	480.31	199.16	0	.....	.40
San Francisco, Calif., naval training station	2,110	155	954.45	333.38	3	18.48	24.25
THIRTEENTH NAVAL DISTRICT.							
Keyport, Wash., naval torpedo station	206	5	31.55	197.42	0	.....	0
Puget Sound, Bremerton, Wash.:							
Navy yard, including marine barracks	454	1	28.63	5.56	0	.....	0
Receiving ship	208	4	250.00	105.03	1	62.50	5.52
Total	33,260	1,348	526.79	264.63	16	6.25	10.76

TABLE No. 4 (continued).—*Communicable diseases reported from the above listed stations for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

CEREBROSPINAL FEVER.

Total admissions	0
Annual rate per 1,000	
Average rate since July 1	0.02

DIPHTHERIA.

Total admissions	0
Annual rate per 1,000	
Average rate since July 1	0.19

MALARIA.

Total admissions	10
Annual rate per 1,000	3.90
Average rate since July 1	3.90
Incidence:	
Training station, Hampton Roads, Va	1
Marine barracks, Quantico, Va	2
Receiving ship, Charleston, S. C	5
Training station, San Francisco, Calif	1
Receiving ship, Bay Ridge, N. Y	1

GERMAN MEASLES.

Total admissions	0
Annual rate per 1,000	
Average rate since July 1	1.05

MEASLES.

Total admissions	1
Annual rate per 1,000	0.39
Average rate since July 1	0.37

MUMPS.

Total admissions	2
Annual rate per 1,000	0.78
Average rate since July 1	3.78
Incidence:	
Training station, Hampton Roads, Va	1
Receiving ship, Hampton Roads, Va	1

PNEUMONIA.

Total admissions	1
Annual rate per 1,000	0.39
Average rate July 1	0.62
Incidence: Submarine Base, New London, Conn	1

SCARLET FEVER.

Total admissions	1
Annual rate per 1,000	0.39
Average rate since July 1	0.23
Incidence: Training station, San Francisco, Calif	1

TUBERCULOSIS.

Total admissions	1
Annual rate per 1,000	0.39
Average rate since July 1	0.49
Incidence: Receiving ship, Puget Sound, Wash	1

INFLUENZA.

Total admissions	21
Annual rate per 1,000	8.2
Average rate since July 1	5.0
Incidence:	
Receiving ship, Bay Ridge, N. Y	3
Receiving station, Philadelphia, Pa	1
Air station, Hampton Roads, Va	2
Training station, Hampton Roads, Va	8
Receiving ship, Hampton Roads, Va	1
Receiving ship, Charleston, S. C	4
Submarine base, San Pedro, Calif	2

TYPHOID FEVER.

Total admissions	0
Annual rate per 1,000	
Average rate since July 1	0.

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

Hospitals.	Cerebro-spinal fever.		Diphtheria.		Malaria.		German Measles.		Measles.		Mumps.	
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.
Charleston						1				1		
Great Lakes					1							
League Island					1							
Mare Island							1	1			1	
New York												1
Norfolk					7	5					2	2
Quantico					3	2						
Washington					1	1						
Total					13	9	1	1		1	3	3

Hospitals.	Pneumonia.		Scarlet fever.		Tuberculosis.		Influenza.		All causes.		
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Discharged.
Annapolis		1			3	1	1		54	97	92
Charleston		1							204	214	263
Chelsea	2	1				5	2		469	352	287
Great Lakes	1				1				266	166	183
Key West									7	13	18
League Island	6	5			2	1	2	2	317	250	260
Mare Island	4	4	1		11	12	1	1	339	230	259
Newport				1					68	31	51
New York	5	5			15	5	4	4	529	378	310
Norfolk	5	1	1	1	15	13	1	1	254	189	169
Paris Island									32	27	38
Pensacola		1							48	41	39
Portsmouth					12	10			40	36	19
Puget Sound						1			76	57	63
Quantico	1	2			1				55	54	93
San Diego	7	3			16	2		3	296	233	322
Washington	2	2			1	1		3	272	237	180
Total	33	26	2	2	77	51	11	14	3,326	2,605	2,646

TABLE No. 6.—*Number of admissions reported by form F cards and annual rates per 1,000 for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

Classes.	Navy (complement 113,163).		Marine Corps (complement 22,745).		Total (complement 135,908).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood	1	0.11	1	0.57	2	0.19
Diseases of circulatory system	12	1.38	7	4.00	19	1.82
Diseases of digestive system	402	46.18	83	47.45	485	46.39
Diseases of ductless glands and spleen	4	0.46	1	0.57	5	0.48
Diseases of ear	70	8.04	14	8.00	84	8.04
Diseases of eye and adnexa	44	5.06	13	7.43	57	5.45
Diseases of genito-urinary system (non-venereal)	127	14.59	22	12.58	149	14.25
Communicable diseases transmissible by oral and nasal discharges	134	15.39	25	14.29	159	15.21
Communicable diseases transmissible by intestinal discharges	5	0.57	2	1.14	7	0.67
Communicable diseases transmissible by insects and other arthropods	58	6.66	154	88.04	212	20.28
Tuberculosis (all forms)	30	3.45	4	2.29	34	3.25
Venereal diseases	994	114.19	160	91.47	1,154	110.39
Other diseases of infective type	226	25.96	63	36.02	289	27.64
Diseases of lymphatic system	45	5.17	13	7.43	58	5.55
Diseases of mind	16	1.84	10	5.72	26	2.49
Diseases of motor system	48	5.51	17	9.72	65	6.22
Diseases of nervous system	31	3.56	9	5.15	40	3.83
Diseases of respiratory system	724	83.17	142	81.18	866	82.84
Diseases of skin, hair, and nails	90	10.34	25	14.29	115	11.00
Hernia	44	5.05	8	4.57	52	4.97

TABLE No. 6.—*Number of admissions reported by form F cards and annual rates per 1,000 for the four-week period Nov. 6 to Dec. 3, 1921, inclusive*—Contd.

Classes.	Navy (complement 113,163).		Marine Corps (complement 22,745).		Total (complement 135,903).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Miscellaneous diseases and conditions	76	8.73	20	11.43	96	9.18
Parasites (fungi and certain animal parasites)	126	14.47	22	12.58	148	14.16
Tumors	4	0.46	0	.....	4	0.38
Injuries	480	55.14	98	56.02	578	55.29
Poisons	33	3.79	10	5.72	43	4.11
Total	3,824	439.30	923	527.66	4,747	454.08

TABLE No. 7.—*Total admissions reported by form F cards for certain communicable diseases and annual rates per 1,000 for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

Diseases.	Navy (complement 113,163).		Marine Corps (complement 22,745).		Total (complement 135,903).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 8:						
Chicken pox	5	0.57	0	.....	5	0.48
Diphtheria	3	.34	1	0.57	4	.38
German measles	0	.....	4	2.29	4	.38
Influenza	87	9.99	15	8.58	112	10.71
Measles	3	.34	1	.57	4	.38
Mumps	10	1.15	3	1.72	13	1.24
Pneumonia, broncho	9	1.03	1	.57	10	.96
Pneumonia, lobar	15	1.72	0	.....	15	1.43
Scarlet fever	1	.11	0	.....	1	.10
Smallpox	1	.11	0	.....	1	.10
Class 9:						
Paratyphoid fever	1	.11	0	.....	1	.10
Dysentery, bacillary	2	.23	0	.....	2	.19
Dysentery, entamebic	2	.23	2	1.14	4	.38
Class 10:						
Dengue	34	3.91	88	50.31	122	11.67
Malaria	24	2.76	66	37.73	90	8.61
Class 11:						
Tuberculosis (all forms)	30	3.45	4	2.29	34	3.25
Class 12:						
Chancroid infection	161	18.50	40	22.87	201	19.23
Gonococcus infection	707	81.22	96	54.88	803	76.81
Syphilis	126	14.47	24	13.72	150	14.35
Total	1,221	140.27	345	197.23	1,566	149.80

TABLE No. 8.—*Deaths reported, entire Navy for the four-week period Nov. 6 to Dec. 3, 1921, inclusive.*

Causes.	Navy (complement 113,163).	Marine Corps (complement 22,740).	Total (complement 135,903).
Cerebrospinal fever	0	1	1
Meningitis, cerebrospinal	2	0	2
Tuberculosis, chronic, pulmonary	3	0	3
Tuberculosis, other forms	1	0	1
Syphilis [1]	1	0	1
Other diseases	11	0	11
Drowning	2	0	2
Other accidents and injuries	6	6	12
Total	26	7	33
Annual death rate per 1,000, all causes	3.00	4.00	3.16
Annual death rate per 1,000, disease only	2.07	0.57	1.82

[1] Cerebrospinal.

ORDERS ISSUED TO OFFICERS AND NURSES.

NOVEMBER 12, 1921:

Commander A. H. Allen, Medical Corps, U. S. Navy. Detached navy yard, Philadelphia, to the U. S. S. *Olympia*.

NOVEMBER 14, 1921:

Commander J. T. Haynes, Medical Corps, U. S. Navy. Detached Naval War College, Newport, R. I., to U. S. S. *Great Northern*.

NOVEMBER 15, 1921:

Lieutenant H. C. Johnson, Medical Corps, U. S. Navy. To duty Naval Training Station, San Francisco, Calif.

Lieutenant H. A. Noreen, Medical Corps, U. S. Navy. Detached Naval Training Station, Great Lakes, Ill., to duty Naval Torpedo Station, Newport, R. I.

Lieutenant J. C. Smith, Medical Corps, U. S. Navy. To duty naval hospital, Charleston, S. C.

Lieutenant J. W. Troxell, Medical Corps, U. S. Navy. To duty naval hospital, New York, N. Y.

NOVEMBER 16, 1921:

Lieutenant Commander W. R. Levis, Medical Corps, U. S. Navy. Detached naval hospital, League Island, Philadelphia, Pa., to U. S. S. *Vego*.

Lieutenant J. H. Cloyd, Medical Corps, U. S. Navy. Detached U. S. S. *Leonidas* to U. S. S. *Denebola*.

Lieutenant J. Holden, Medical Corps, U. S. Navy. Detached U. S. S. *Relief* to duty naval hospital, Washington, D. C.

Lieutenant R. A. Nolan, Medical Corps, U. S. Navy. Detached Virgin Islands to duty receiving barracks, Hampton Roads, Va.

Lieutenant H. B. Duncan, Dental Corps, U. S. Navy. Detached U. S. S. *Idaho* to navy yard, New York, N. Y.

Lieutenant A. H. Hetler, Medical Corps, U. S. Navy. Detached U. S. S. *Leonidas* to U. S. S. *Denebola*.

NOVEMBER 18, 1921:

Lieutenant Commander A. E. Beddoe, Medical Corps, U. S. Navy. Detached U. S. S. *Dolphin* to Fifth Regiment Marines, Quantico, Va.

Lieutenant R. I. Craig, Medical Corps, U. S. Navy. Detached U. S. S. *Relief* to U. S. S. *Antares*.

Lieutenant W. A. Fort, Medical Corps, U. S. Navy. Detached U. S. S. *South Carolina* to duty Virgin Islands.

Lieutenant H. C. Kellers, Medical Corps, U. S. Navy. Detached naval hospital, Charleston, S. C., to U. S. S. *Salinas*.

Lieutenant E. D. Leete, Medical Corps, U. S. Navy. Detached Naval Torpedo Station, Newport, R. I.; revocation of appointment effective December 24, 1921.

Lieutenant J. I. Yohannan, Medical Corps, U. S. Navy. Detached naval hospital, New York, N. Y., to U. S. S. *Altair*.

Lieutenant (junior grade) J. Braum, Medical Corps, U. S. Navy. Detached from U. S. S. *Wyoming* to U. S. S. *Yukon*.

Lieutenant (junior grade) J. H. Payne, Medical Corps, U. S. Navy. Detached receiving ship, Boston, Mass., to Marine Recruiting Station, Boston, Mass.

NOVEMBER 19, 1921:

Commander C. E. Ryder, Medical Corps, U. S. Navy. Detached navy yard, New York, to Sixteenth Naval District.

Lieutenant Commander M. E. Higgins, Medical Corps, U. S. Navy. Detached naval dispensary, Washington, D. C., to Bureau of Medicine and Surgery.

Lieutenant Commander J. M. Quinn, Medical Corps, U. S. Navy. To treatment Fitzsimons General Hospital, Denver, Colo.

Lieutenant Commander W. A. Vogelsang, Medical Corps, U. S. Navy. Detached Fifth Regiment of Marines, Quantico, Va., to Sixteenth Naval District.

Lieutenant Commander W. W. Wickersham, Medical Corps, U. S. Navy. Detached U. S. S. *San Francisco* to U. S. S. *Shawmut*.

Lieutenant H. C. Johnson, Medical Corps, U. S. Navy. Transferred to retired list, U. S. Navy.

Lieutenant H. G. Ralph, Dental Corps, U. S. Navy. Detached U. S. S. *Kansas* to U. S. S. *Chaumont*.

Lieutenant W. R. Angell, Medical Corps, U. S. Navy. Detached Marine Recruiting Station, Boston, Mass., to destroyer squadron, Atlantic Fleet.

Lieutenant J. Magnette, Medical Corps, U. S. Navy. Detached naval hospital, New York, to U. S. S. *Wyoming*.

Lieutenant L. O. Riggert, Medical Corps, U. S. Navy. Detached Squadron Nine to medical officer, Squadron Fifteen.

Lieutenant F. E. Tierney, Medical Corps, U. S. Navy. Detached U. S. S. *Blackhawk* to squadron medical officer, Squadron Nine.

Lieutenant L. C. Frost, Dental Corps, U. S. Navy. Detached Marine Barracks, Quantico, Va., to Sixteenth Naval District.

Lieutenant Clifford E. Kelly, Dental Corps, U. S. Navy. Detached Naval Training Station, Hampton Roads, Va., to naval station, Guam.

Lieutenant (junior grade) L. M. Desmond, Dental Corps, U. S. Navy. Detached navy yard, N. Y., to U. S. S. *Camden*.

NOVEMBER 21, 1921:

Lieutenant Commander E. A. M. Gondreau, Medical Corps, U. S. Navy. Detached marine barracks, Norfolk, Va., to U. S. S. *Boreas*.

Lieutenant R. D. Mackey, Medical Corps, U. S. Navy. To Fifth Regiment Marines, Quantico, Va.

Lieutenant C. W. Rose, Medical Corps, U. S. Navy. Detached receiving barracks, Hampton Roads, to marine barracks, Norfolk, Va.

Lieutenant C. F. Wood, Medical Corps, U. S. Navy. Detached Naval Training Station, Newport, R. I. To duty naval hospital, Portsmouth, N. H.

NOVEMBER 22, 1921:

Lieutenant E. G. Dickinson, Medical Corps, U. S. Navy. To duty Hospital Corps Training School, San Francisco, Calif.

Lieutenant R. K. Joslin, Medical Corps, U. S. Navy. Detached U. S. S. *San Francisco* to U. S. S. *Manmee*.

Lieutenant R. J. Lontsker, Medical Corps, U. S. Navy. Detached receiving station, San Francisco, Calif., to Naval Training Station, San Francisco, Calif.

Lieutenant F. G. Speidel, Medical Corps, U. S. Navy. Detached U. S. S. *St. Louis* to U. S. S. *Chaumont*.

Lieutenant J. A. Topper, Medical Corps, U. S. Navy. To U. S. S. *Rochester*.

Lieutenant A. L. Burleigh, Dental Corps, U. S. Navy. Detached U. S. S. *Frederick* to U. S. S. *Melville*.

NOVEMBER 23, 1921:

Lieutenant Commander J. A. Bass, Medical Corps, U. S. Navy. Detached U. S. S. *Great Northern* to naval hospital, Charleston, S. C.

Lieutenant Commander M. Donelson, Medical Corps, N. S. Navy. Detached U. S. S. *Minnesota* to U. S. S. *Chaumont*.

Lieutenant R. W. Auerbach, Medical Corps, U. S. Navy. Resignation accepted to take effect December 24, 1921.

Lieutenant H. McCoy, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., resignation accepted.

NOVEMBER 25, 1921:

Commander N. T. McLean, Medical Corps, U. S. Navy. Detached Naval Training Station, Newport, to navy yard, New York, N. Y.

Lieutenant R. D. Mackey, Medical Corps, U. S. Navy. Detached Fifth Regiment of Marines, Quantico, Va., to Marine Expeditionary Force, Santo Domingo.

NOVEMBER 29, 1921:

Lieutenant Commander W. E. Lawhead, Medical Corps, U. S. Navy. Detached U. S. S. *Old Constellation* to naval hospital, Boston, Mass.

Lieutenant Commander V. H. Carson, Medical Corps, U. S. Navy. U. S. S. *Panther* to U. S. S *New Orleans*.

Lieutenant E. D. Hardin, Medical Corps, U. S. Navy. Detached naval station, Olongopo, P. I., to U. S. S. *Huron*.

Lieutenant W. T. Moynan, Medical Corps, U. S. Navy. Detached U. S. S. *Huron* to U. S. S. *Panther*.

NOVEMBER 30, 1921:

Lieutenant J. H. Barton, Medical Corps, U. S. Navy. Detached naval medical supply depot, Brooklyn, N. Y., to duty naval dispensary, New York, N. Y.

Lieutenant W. W. Wade, Medical Corps, U. S. Navy. Detached Naval Training Station, Newport, R. I., to duty naval supply depot, Brooklyn, N. Y.

DECEMBER 1, 1921:

Lieutenant Commander H. L. Smith, Medical Corps, U. S. Navy. Detached receiving ship, Boston, Mass., to duty naval hospital, Chelsea, Mass.

Lieutenant H. W. Miller, Medical Corps, U. S. Navy. Detached Ninth Naval District to duty naval hospital, Great Lakes, Ill.

Lieutenant L. Nottingham, Medical Corps, U. S. Navy. Detached naval hospital, Pensacola, Fla., to duty naval hospital, Great Lakes, Ill.

DECEMBER 2, 1921:

Lieutenant Commander E. G. Hakansson, Medical Corps, U. S. Navy. Detached Third Naval District to naval medical school, Washington, D. C.

Lieutenant Commander C. W. Carr, naval hospital, Canacao, to receiving ship, San Francisco, Calif.

Lieutenant Commander G. A. Riker, Medical Corps, U. S. Navy. Naval station, Cavite, to receiving ship, San Francisco, Calif.

DECEMBER 3, 1921:

Lieutenant Commander F. L. Conklin, Medical Corps, U. S. Navy. Detached U. S. S. *Frederick* to receiving ship, Mare Island, Calif.

Lieutenant J. W. Vann, Medical Corps, U. S. Navy. Detached Navy recruiting station, Norfolk, Va., to duty naval hospital, Chelsea, Mass.

DECEMBER 5, 1921:

Lieutenant Commander W. R. Levis, Medical Corps, U. S. Navy. Detached naval hospital, League Island, Pa., to duty Sixteenth Naval District.

Lieutenant W. J. Walsh, Medical Corps, U. S. Navy. Detached naval hospital, Great Lakes, Ill.; resignation accepted.

DECEMBER 7, 1921:

Lieutenant H. G. Cannon, Medical Corps, U. S. Navy. Detached naval hospital, Annapolis, Md., to U. S. S. *Relief*.

DECEMBER 8, 1921:

Lieutenant Commander G. R. French, Medical Corps, U. S. Navy. Detached U. S. S. *Falcon* to naval medical school, Washington, D. C.

Lieutenant Commander J. J. O'Malley, Medical Corps, U. S. Navy. Detached naval hospital, Washington, D. C., to U. S. S. *Mercy*.

Lieutenant S. B. Forbes, Medical Corps, U. S. Navy. Detached U. S. S. *Relief* to naval hospital, Annapolis, Md.

DECEMBER 10, 1921:

Lieutenant C. E. Alexander, Medical Corps, U. S. Navy. Detached Naval Training Station, San Francisco, Calif., to duty Sixteenth Naval District.

Lieutenant C. C. Brown, Medical Corps, U. S. Navy. Detached naval medical school, Washington, D. C., to U. S. S. *Relief*.

Lieutenant R. I. Craig, Medical Corps, U. S. Navy. Detached U. S. S. *Relief* to U. S. S. *Maumee*.

Lieutenant R. H. Holcomb, Medical Corps, U. S. Navy. Detached Bethlehem Shipbuilding Corporation, Quincy, Mass., to navy yard, Boston, Mass.

Lieutenant (junior grade) D. B. Peters, Medical Corps, U. S. Navy. Detached Navy recruiting station, Columbia, S. C., to naval hospital, Charleston, S. C.

The following nurses have been appointed and assigned at the naval hospitals at the stations indicated:

Charleston, S. C.

Graves, Daisy S., from Roanoke, Va.
Griffith, Annabel, from Baltimore, Md.
Griffith, Gertrude L., from Baltimore, Md.
Hardister, Sallie L., from New London, N. C.
Hoover, Mildred E., from Baltimore, Md.

Chelsea, Mass.

Baird, Grace D., from Everett, Mass.
Dootson, Bertha S., from Boston, Mass.
Gay, Clara C., from Boston, Mass.
Johnson, Olga D. (reappointed), from Campello, Mass.
McCabe, Edith E., from Brighton, Mass.
Manning, Isabella C., from Boston, Mass.
Smith, Katie Mae, from Beachmont, Mass.

Great Lakes, Ill.

Harmon, Martha A., from Ottawa, Ill.

League Island, Pa.

Best, Maude A., from Toledo, Ohio.
Flynn, Florence G., from New York, N. Y.

Mare Island, Calif.

Henrich, Bertha C., from Aberdeen, Wash.
MacMillan, Grace E., from Aberdeen, Wash.

New York, N. Y.

Behmer, Bary Jane, from New York, N. Y.
Doyle, Charlotte M., from New York, N. Y.
Durant, Claude M., from Noroton Heights, Conn.
Jaeger, Jennie A., from Newark, N. J.
Keech, Grace E., from Gouverneur, N. Y.
Myers, Mildred R., from Newport, R. I.
O'Donovan-Rossa, Isabel, from Staten Island, N. Y.

Parris Island, S. C.

Snow, Nelle S., from Anniston, Ala.
Vestal, Grace B., from Atlanta, Ga.

Washington, D. C.

Easton, Mary Louise, from Washington, D. C.
Harris, Florence Edna (Mrs.), from Toledo, Ohio.

Washington, D. C.—Continued.

Milleson, Mary B. (Mrs.), from Washington, D. C.
Wells, Daisy E., from Washington, D. C.
Whitehead, Elizabeth H., from Washington, D. C.

The following nurse, U. S. N. R. F., who had been placed in inactive status, has been recalled to duty:

San Diego, Calif.

Roburds, Laura A., from Pasadena, Calif.

The following nurses have been transferred to—

Canacao, P. I.

Chew, Ada, from Hospital Corps Training School, San Francisco, Calif.
Cleaver, Ruth Elgin, from Guam.
Hume, Mathilda E., from Guam.

Charleston, S. C.

Scudder, Adele, from Pensacola, Fla.

Great Lakes, Ill.

Todd, Eva C., from Mare Island, Calif.

Guam.

Braddick, Hazel V., from Mare Island, Calif.

League Island, Pa.

Bartlett, Elizabeth M., from Norfolk, Va.
Mullen, Elizabeth G., from Norfolk, Va.

Mare Island, Calif.

Pringle, Martha E. (chief nurse), from League Island, Pa.
Harding, Estelle, from Canacao, P. I.
Keavey, Elizabeth J., from Canacao, P. I.
Qually, Inga J., from Puget Sound, Wash.
McNelis, Cartherine C., from Canacao, P. I.

New York, N. Y.

Jordan, Lucia D. (chief nurse), from Pensacola, Fla.
Anderson, Ruth M., from Mare Island, Calif.
Glancy, Katherine C., from Mare Island, Calif.
Ohlson, Elsie S., from Mare Island, Calif.

Pensacola, Fla.

Hand, Mary E. (chief nurse), from New York, N. Y.
Sartin, Edna May, from Mare Island, Calif.

Portsmouth, Va.

Truitt, Lillie Mae, from Quantico, Va.

San Diego, Calif.

Murphy, Flora A., from Mare Island, Calif.

Washington, D. C. (temporary duty).

Brown, Margaret M., from Quantico, Va.
Miney, Mary J., from Quantico, Va.

U. S. S. Chanmont (temporary duty).

Lane, Rosa L., from Charleston, S. C.
Welty, Ada E., from Charleston, S. C.
Pringle, Martha E. (chief nurse), from League Island, Pa.

U. S. S. Henderson (temporary duty).

Fitzgerald, Susie I. (chief nurse), from Newport, R. I.
Anderson, Ruth M., from Mare Island, Calif.
Glancy, Katherine C., from Mare Island, Calif.
Ohlson, Elsie S., from Mare Island, Calif.

U. S. S. Argonne (temporary duty).

Bartlett, Elizabeth M., from Norfolk, Va.
Mullen, Elizabeth G., from Norfolk, Va.

Honorable discharges.

Worster, Helen M., November 26, 1921, Portsmouth, Va.
Burns, Therese D., November 27, 1921, Parris Island, S. C.

Honorable discharges—Continued.

Eidemiller, Mae V., December 14, 1921, Pearl Harbor, Hawaii.

Resignations.

Kershner, Ada M., November 27, 1921, New York, N. Y.
Lea, Edith A., December 4, 1921, League Island, Pa.
Howard, Lucy E., December 5, 1921, New York, N. Y.
Ready, Rosaline A. J., December 13, 1921, Fort Lyon, Colo.
McLaughlin, Katherine, December 14, 1921, Mare Island, Calif.

Placed in inactive status.

Wagner, Gertrude B., November 26, 1921, Parris Island, S. C.

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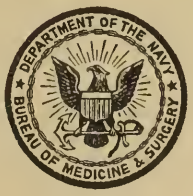
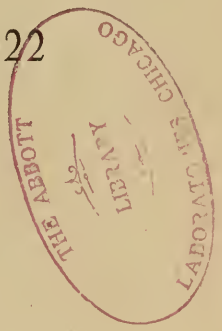
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

FEBRUARY, 1922
(MONTHLY)





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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

Volume I, No. 1, April, 1907.
Volume II, No. 1, January, 1908.
Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
Volume XII, No. 3, July, 1918.

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TABLE OF CONTENTS.

Page.

PREFACE v

NOTICE TO SERVICE CONTRIBUTORS vi

SPECIAL ARTICLES:

SIZE OF THE NORMAL HEART, A TELEROENTGEN STUDY.
By Commander H. W. Smith and Lieutenant Commander W. A. Bloedorn, Medical Corps, U. S. N 219

PHYSICAL DEVELOPMENT OF MIDSHIPMEN.
By Lieutenant E. B. Taylor, Medical Corps, U. S. N 239

SOME ELEMENTS OF LEADERSHIP.
By E. L. Munson, Colonel, Medical Corps, U. S. A 251

HISTORICAL:

WITH ANSON TO JUAN FERNANDEZ, PART II.
By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N 265

EDITORIAL:

ON THE MAKING OF ABSTRACTS—ON THE EXPRESSION OF VISUAL ACUITY IN MEDICAL REPORTS 280

SUGGESTED DEVICES:

A FORM "X" CARD.
By Captain A. Farenholt, Medical Corps, U. S. N 283

CLINICAL NOTES:

RESULTS OF REFRACTION OF SEVENTY-SIX MIDSHIPMEN.
By Lieutenant F. A. Hughes, Medical Corps, U. S. N 285

RECURRENCE IN A CASE OF HYDATID DISEASE.
By Lieutenant C. S. Norburn, Medical Corps, U. S. N 288

A DIAGNOSTIC SIGN DIFFERENTIATING BETWEEN ERUPTIONS CAUSED BY COWPOX VACCINATION AND THOSE DUE TO SMALLPOX AND CHICKEN POX.
By Commander P. R. Stalnaker, Medical Corps, U. S. N 290

REPORT OF THREE "HALLUX VALGUS" (BUNION) OPERATIONS, USING MAYO'S TECHNIQUE.
By Commander A. H. Robnett, Medical Corps, U. S. N 291

REPORTS:

THE HOSPITAL STANDARDIZATION PROGRAM OF THE AMERICAN COLLEGE OF SURGEONS.
By Commander R. C. Holcomb, Medical Corps, U. S. N 293

PROGRESS IN MEDICAL SCIENCES.

GENERAL MEDICINE.—Chronic myocarditis and its management.—Experiments on the preservation of lemon juice and prevention of scurvy.—Scurvy: A system of prevention for a polar expedition based on present-day knowledge.—Venous puncture by means of steel needles.—Wassermann reaction 301

SURGERY.—First aid work on shore with Royal Naval Division.—Hypertrophic tuberculosis of the ileocecal region.—Importance of examination of patients by the anesthetist previous to anesthesia.—Experimental and histological investigation of rectal fistulas.—Treatment of fractures of the humerus by suspension and traction.—Fractures of the head and neck of the radius 310

PROGRESS IN MEDICAL SCIENCES—Continued. Page.

Tropical Medicine.—Oriental Sores.—Afebrile quartan malaria with urticaria.—Three schistosomes in Natal which possibly attack man.—Cultivation of trichomonas hominis.—Acute bacillary dysentery.—Monilias of the gastro-intestinal tract in relationship to sprue.—Hookworm infection in Brazil.—Relapsing fever in Panama.—Treatment of kala-azar with some antimonial preparations.—Human infection with *Isospora hominis*.—Etiology of gangosa and its relation to papulocircinate yaws 324

Physiological Chemistry.—Ion migration between cells and plasma.—Experimental rickets in rats.—Extraction and concentration of vitamines.—Respiration and blood alkali during carbon monoxide asphyxia.—Antiketogenesis.—The Effect of heat and oxidation upon antiscorbutic vitamine.—Production of rickets by diets low in phosphorus and fat-soluble A. vitamines.—Effect of muscular exercise upon certain common blood constituents.—Comparative influence of green and dried plant tissue, cabbage, orange juice, and cod liver oil on calcium assimilation.—Method for the determination of sugar in normal urine.—Parathyroids and creatinine.—Variations in the acid-base balance of the blood.—Thiocyanate content of the saliva and urine in pellagra 329

Eye, ear, nose, and throat.—Use of scarlet red emulsion in atrophic rhinitis (ozena). Accessory sinus blindness 329

NOTES AND COMMENTS:

Spiders in Medicine.—Meeting of the American Academy of Ophthalmology and Oto-laryngology.—Meeting of the American Dietetic Association.—Japanese medical world.—Some submarine notes.—School of Tropical Medicine at Calcutta.—Army method of handling syphilis.—Prophylactic vaccination for the prevention of pneumonia 339

NURSE CORPS 351

DIGEST OF DECISIONS 353

BOOK NOTICES 355

QUERIES 361

NOTES ON PREVENTIVE MEDICINE, PREVENTIVE MEDICINE STATISTICS, LETTERS, ORDERS, NEW LEGISLATION, MOVEMENTS OF OFFICERS AND NURSES 363

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc. All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.*

U. S. NAVAL MEDICAL BULLETIN

VOL. XVI. FEBRUARY, 1922. No. 2.

SPECIAL ARTICLES.

THE SIZE OF THE NORMAL HEART, A TELEROENTGEN STUDY.[1]

By Commander H. W. SMITH, Medical Corps, United States Navy, and Lieutenant Commander W. A. BLOEDORN, Medical Corps, United States Navy.

INTRODUCTION.

This study owes its inception to difficulties experienced in deciding upon the presence or absence of enlargement of the heart, in the cases of actual or suspected disease of the heart met with among midshipmen and candidates for admission to the Naval Academy.

It frequently happened that the decision as to the presence of organic disease depended on our ability to demonstrate the existence of enlargement, and thus the means of ascertaining the relative size of the heart became a matter of immediate concern to a number of individuals—not only to members of the Medical Corps and the young man undergoing examination, but also to his parents and sponsors.

The actual size of a heart was easily obtained by means of teleroentgenograms; but on attempting to pass judgment on its relative size it became apparent that we were entering debatable ground, principally from lack of unquestionable standards.

Tables of normal measurements have been constructed by Moritz, Dietlen, Veith, Groedel, and others; and Albers-Schönberg in 1910 published in full the tables prepared by previous investigators. However, these articles were not generally accessible, and when it was first decided to undertake the study the only tables available for daily reference were those of Claytor and Merrill and of Barreen, and in regard to these, we felt that so few cases had been used in obtaining their norms that comparisons based on their tables were open to just criticism.

Within the year there have been published three excellent teleroentgenologic studies of the heart (3, 4, 5), which, although not designed to establish the size of the normal heart, have made available for the compilation of normal standards many more cases than had heretofore been utilized, and thus tended to diminish the possible value of our work. Nevertheless our study was continued, since we believed that the midshipmen at the Naval Academy would furnish

[1] From the U. S. Naval Hospital, Annapolis, Md.

a homogeneous series peculiarly suitable for fixing the limits of normal variation; that it was desirable to secure direct tables based on a technic so simplified that it could be followed wherever X-ray work of any kind is done; and, finally, that our methods of using the surface area of the body, as the basis for constructing tables of dimensions and the incorporation of the heart "angle" in the transverse diameter curves, were contributions of sufficient usefulness to merit publication.

The material for this study consisted of 500 midshipmen at the United States Naval Academy. These men form a selected group physically, they being subjected to a rigid physical examination on admission to the academy and twice each year thereafter. In addition, each man was given a cardiac examination by us, which included a record of blood pressure and a careful inquiry into athletic pursuits and possible disease symptoms. Thus our series is not only numerically large, but is unusually homogeneous.

It is fully recognized that size alone may be an unreliable indication of the presence of disease or of functional incompetency. In spite of this fact, our study has been limited to a determination of the size of the normal heart, since it seemed a sufficient objective to secure a table of standards by reference to which the presence or absence of any marked degree of enlargement might be ascertained. It is for the internist to weigh, in conjunction with other data, the significance of the figures furnished by the roentgenologist.

CHOICE OF METHOD.

Of the three methods of examining the heart by the Roentgen ray, teleroentgenology appeared the most suitable for our purpose, although it presents certain disadvantages, notably its failure to differentiate in the gross shadow the several chambers and to make clear the line of demarcation between the base of the heart and the great vessels, defects which impair seriously the value of estimations of the area of the silhouette and of the dimensions, except MR, ML, and TD.

Its advantages which influenced us were:

1. It is simple, being utilizable in any surroundings where an X-ray machine is available.

2. It is accurate and objective for what is perhaps the most useful dimension, TD, and therefore independent of the personal equation and experience of the operator.

3. Its accuracy for area and dimensions, other than TD, is not greatly inferior to that of orthodiagraphy and is superior to that of fluoroscopy.

4. A permanent form of record is obtained for study or for future reference and comparison.

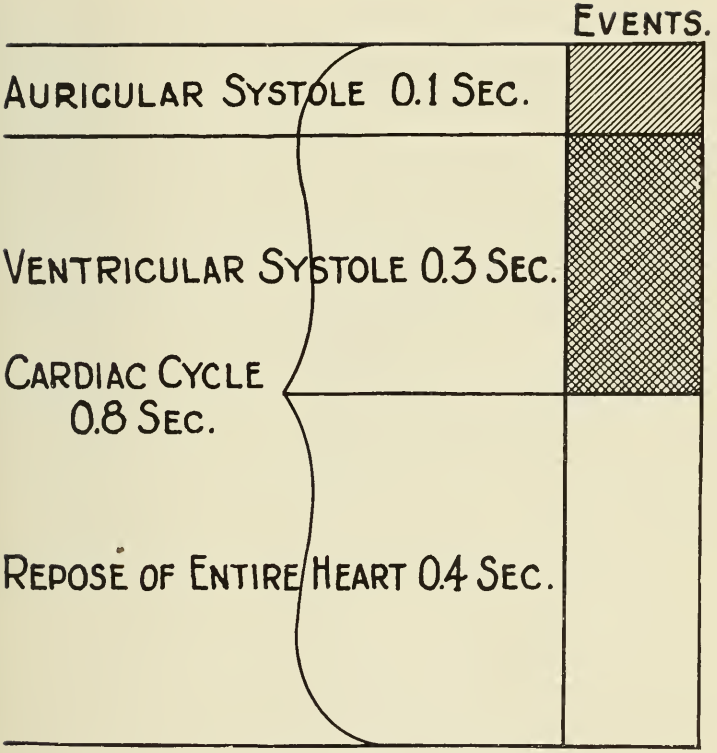


FIG. 1.—SHOWING THE RELATIVE TIMES OCCUPIED BY THE EVENTS OF THE HEART CYCLE ESTIMATED FOR A PULSE RATE OF 72 A MINUTE (FROM BUTLER, DIAGNOSTICS OF INTERNAL MEDICINE, D. APPLETON & CO.)

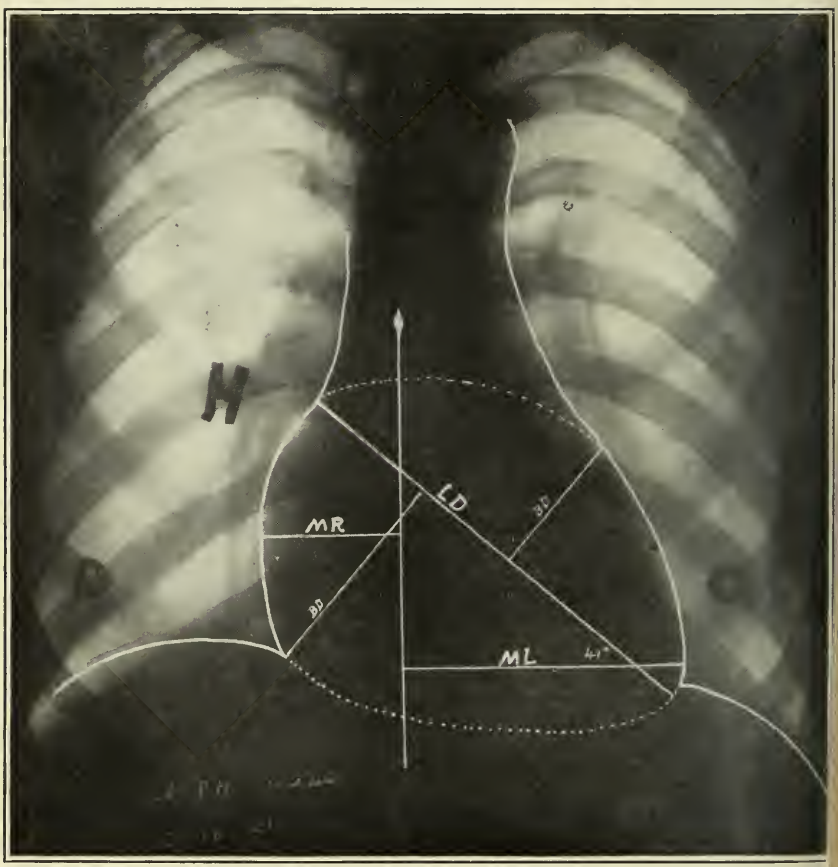


FIG. 2.—TYPICAL SILHOUETTE WITH THE DIMENSIONS USUALLY TAKEN.

Another consideration was that practically all published tables are compiled from data obtained from teleroentgenograms. This circumstance confirmed our opinion as to the general usefulness of the method, and likewise makes it possible, by the use of simple translating formulae, to compare our results with those of other observers.

A feature of teleroentgenograms, although one not perhaps strictly germane to the purpose of our investigation, is that they lend themselves to study by those clinicians who value them apart from their measurements. Changes in the outline and position of the silhouette may furnish indications of pathological conditions as surely as changes in its size, and usually much earlier; and the relation of the silhouette to common landmarks is in itself worthy of record, not simply because these standards have the familiarity of long usage, but also because such relations, probably more than the interior dimensions of the heart, take into account those factors of the shape of the chest and other anatomical correlations which we find very difficult to evaluate in terms of mathematics.

PHASE OF HEART CYCLE.

The diastolic shadow, that from which estimates of the size of the heart are usually derived, may be obtained by the method of LeWald and Turrell, who, using a timer actuated by a mechanism set off by the pulse wave, were able to time their exposures so as to be synchronous with the diastolic phase of the heart cycle; or by the device of prolonging the exposure so as to include one or more complete cycles. The latter method, requiring no special apparatus, is the one of choice, provided it can be shown to be equally accurate.

Inspection of the diagram, figure I, showing the relative times occupied by the events of the heart cycle, will make it clear why the principal shadow from a prolonged exposure is that of diastole.

Diastole, it will be seen, occupies one-half of the complete cycle. During this phase the heart is relaxed, thereby casting its largest shadow, and is in a state of suspended activity in which it alters neither its size, shape, nor position unless acted on by extrinsic forces. Whereas, during the other half of the cycle, systole, it is smaller, and its outlines are constantly being shifted by changes in its position, size, and shape. When a fixed shadow is thrown on a photographic plate for one-half of the total exposure, and a shifting shadow for the other half, the one definite outline will be that of the fixed shadow—in this case that of diastole. The correctness of this presumption is attested by the experience of previous investigators.

Bertrand Smith, in both his studies, used exposures of from one to four seconds' duration, he stating that they gave satisfactorily uniform results.

Holmes and Ruggles, page 122, affirm that "the time of exposure should be sufficiently long to cover one full heart cycle, so that the shadow obtained will be the shadow of the heart in diastole. When very rapid exposures are made, the resulting picture (in the absence of special mechanism) may represent the heart either in systole or diastole or at some phase between. * * * Therefore, it is evident that a relatively long exposure is desirable."

Eyster and Meek state: "The determination of the diastolic size and shape offers no serious technical difficulties, because it is the phase of the heart beat which gives the greatest shadow, and the exposure may be prolonged to include several cardiac cycles."

Thus, assuming as we may for the present that the position of the heart is not greatly altered during natural, quiet breathing, a question that will be discussed later, it appears from the considerations noted, and from the experience of several observers, that the principal silhouette obtained by exposures embracing one or more complete heart cycles will be that of diastole, and that the silhouette so obtained is identical with that secured by more complicated methods.

PHASE OF RESPIRATION.

In most of the published studies it is advised that the exposures be made with the breath held in moderately deep inspiration (2, 5, 6, 7); respiration being suspended in order to obviate the effects on the heart of the movements of the diaphragm; the inspiratory phase being chosen as giving a clearer outline; and both deep inspiration and deep expiration being avoided, since they are believed to produce marked alterations in the size and shape of the heart as well as in its position. Recent work has confirmed the belief regarding the effects of forced respiratory movements, but fails to support the idea that respiration must be entirely suspended in order to preclude changes in the heart's position.

Cohn (4), in his study, timed his exposures particularly with reference to respiration. The men photographed were allowed to breathe normally, but the exposures were sufficiently brief and so timed as to record the heart shadow at any selected point in respiration. From comparison of the plates of 56 cases, photographed in both expiration and inspiration, he concludes that, although during inspiration the heart silhouette and the diameters are increased, significant differences in size do not usually occur during the inspiration and expiration of normal breathing, and for clinical purposes the influences of the phases of normal respiration on the size of the heart may be neglected.

Le Wald and Turrell (3), working with a special object, made all their exposures synchronous with diastole, but with the phase of

respiration noted. Their observations, therefore, are particularly valuable regarding the effect of the phase of respiration on the heart. They state, in substance:

(*a*) The lifting of the apex and the broadening of the heart during respiration have been recognized, but the amount of this change does not seem to have been fully realized.

(*b*) There is a distinct broadening of the shadow during expiration toward the right as well as toward the left.

(*c*) During inspiration the thoracic organs are put on the stretch, are made to assume a more vertical position, and they are narrowed.

(*d*) Even with the breath effectually held, movements of the diaphragm occur, with resulting influence on the size and position of the heart.

(*e*) The changes in shape and size secondary to respiration are often sufficient to lead to a mistaken diagnosis of enlargement of the heart.

(*f*) Our results would seem to show that, during normal, quiet breathing, the changes in the transverse diameter are comparatively small, notwithstanding a fairly large excursion of the diaphragm.

Groedel, likewise, finds that the heart does not, as a rule, change in size during quiet respiration, the excursion of the left border rarely exceeding 2 millimeters.

We, also, interested to see for ourselves what effects on the heart normal respiratory movements might have, made two plates of each of our earlier cases. In making one exposure the pulse rate was obtained and an automatic timer set so that the duration of exposure would include one complete heart cycle, the breath being held in moderate inspiration. In making the other the patient was instructed to breathe normally and the exposure was prolonged to 20 seconds' duration. We, as have others, found that the changes in the position of the heart during quiet breathing were either too slight in extent or too brief in duration to impair the distinctness of the outlines of the diastolic shadow, and that the variations in the measurement of corresponding plates were negligible.

Hence we may conclude from the evidence available bearing on the influence of respiration on the cardiac dimensions that in order to secure a representative silhouette of the heart the exposure should not be made during either deep inspiration or deep expiration, but that the exposure may be made with perhaps equally good results either during a briefly suspended inspiration or during normal, quiet breathing.

Since, then, an accurate and well-defined shadow of the heart in diastole is obtainable in exposures of such length as to include a number of complete heart cycles, and since the size and position of

the heart are altered very little by the respiratory movements of quiet breathing no objection can be advanced against a long exposure.

Of a more positive nature are the observations of others on the appearances of the heart during suspended respiration, which show that it is difficult to make patients inspire to the point desired, that the diaphragm does not necessarily remain at rest, and that progressive filling of the heart chambers takes place to a degree that distention of the organ and an appreciable enlargement of its shadow result. So it seemed to us that a prolonged exposure during quiet breathing is not only equally as good as a shorter exposure taken during suspended respiration but offers some definite advantages.

The deciding consideration in its favor was that by reason of its independence of special mechanisms and of trained observers and its modest demands on transformer and tube the resulting technic could be followed even in the less well equipped laboratories.

A uniform exposure of 20 seconds' duration was therefore selected with the patient breathing quietly and normally throughout.

TECHNIC.

Table.—The table is set for a vertical position at a height such that the mid-point of the plate lies at the level of the nipples when the patient sits erect.

Tube.—The target is set at the level of the mid-point of the plate and precisely 6 feet distant. The axis of the cylindrical diaphragm used should then be perpendicular to the mid-point of the plate. An aid in setting the tube correctly in a tin cap, perforated at its center, placed over the end of the diaphragm. By this device it is possible to employ in the final adjustment three-point alignment of the center of the plate, the aperture of the cap, and the focal spot of the target.

Patient's landmarks.—See figure 2.

(*a*) A lead arrowhead is placed over the spinous process that is at the level of the nipples.

(*b*) A metal washer is secured over each nipple.

(*c*) A piece of fuse wire, about 5 inches long, is placed over the mid-line of the sternum.

At first, we used the nipples for fixing the location of the center line, but we soon met cases in which what was clearly the mid-line did not lie midway between the nipples. Consequently, we abandoned this method, and instead traced a line from the middle of the suprasternal notch to the umbilicus, verifying its course by the conformation of the sternum, the infrasternal notch, and the hair line.

This anterior wire, in conjunction with the arrowhead over the spine, served also to show how accurate was the antero-posterior

lignment. While moderate rotation of the body appears to alter ery little the gross measurements, it does affect materially the eciprocal values of MR and ML.

Exposure.—In making the exposures, we have used double-screened ilms, a 4-inch spark gap, 10 to 20 milliamperes, and 20 seconds' ex- osure. We prefer a relatively low spark gap, since with harder ays the thinner borders of the heart may be lost.

Patient's position.—The patient is seated, with the anterior surface f the body in full contact with the plate, the frontal plane being arallel to it. The scapulae are removed from the cardiac shadow y relaxing the shoulders and rotating the arms inward. In this osition distortion also is avoided, the gladiolus and the plane of he contour of the heart being brought closely into parallelism with he plate.

Throughout this study the exposures were made with the patient eated, partly as a matter of convenience and partly because sick atients may not be able to stand motionless for the time required. The influence of position on the size of the heart silhouette, which has een noted by several observers, and its amount calculated, will be iscussed in the section dealing with criticism of the measurements.

MEASUREMENTS.

The dimensions universally taken from the silhouette have re- eived accepted designations which will be employed in this study. They are as follows (fig. 2):

MR is the distance from the mid-line to the farthest point of the eart shadow to the right.

ML is the distance from the mid-line to the farthest point of the eart shadow to the left.

TD, the transverse diameter, is the sum of MR and ML.

LD, the long diameter, is the distance from the junction of the eart shadow with that of the great vessels at the upper right border o the apex.

BD, the broad diameter, is the sum of two perpendiculars erected rom LD, one to the most distant point of the border above, the ther to the most distant point of the border below.

Angle.—The angle of inclination of the heart is taken by measur- ng the angle formed between the transverse diameter and the oblique ong diameter.

Area.—The area of the silhouette is obtained by the planimeter; r by the use of transparent paper ruled in square centimeters, the hole squares being counted and the fractions estimated.

Arch.—The transverse diameter of the aortic arch may be of alue.

In outlining the silhouette, the principal diaphragm shadow is traced on each side from the heart outward, and the right and left borders followed as far as they are clearly discernible. The circumference of the heart is next completed by two curved lines joining, above and below, the lateral borders; lastly, the mid-line and the long diameter are drawn in and their respective perpendiculars erected. The angle is then measured by a projector and the area obtained.

It will be seen that the outline of the silhouette is composed of four curves, two traced from the well-defined lateral borders and two drawn arbitrarily with what assistance as may be derived from certain guides.

Of these four curves, the right border of the heart shadow, representing the right auricle, is usually distinct. Its extension upward, representing the vena cava superior, may or may not be visible, since often it is lost in the shadow of the spine.

The junction of the right auricle with the vena cava superior, an important point in mensuration, may usually be identified by the angle formed where the curve of the auricular shadow joins the straight edge of the shadow of the vena cava. There may, however, be no interruption in the even sweep of the curve; or the angle, when present, may be invisible in the vertebral shadow.

The left border of the silhouette is well defined throughout, whatever difficulty is met with usually arising from inability to differentiate the shadows cast by the left auricle and the pulmonary artery, since the line from the arch to the ventricle often pursues a smooth curve which gives no indication of the position of the intervening structures.

Fortunately, however, close scrutiny will almost always disclose an interruption in the continuity of the shadow at or near the point where the vertical portion begins to bear outward to form the ventricular convexity. The appearances are such as would result if the thin lower border of the auricle, offering less resistance to the passage of rays than the thicker surrounding parts, left in this way a gap between the body of the auricle and the upper border of the ventricle. This defect, whatever may be the correct explanation of its occurrence, is invaluable as a guide to the position of the base line.

The site of the pulmonary artery may or may not be shown by a small budding below the convexity of the aortic arch.

The apex is not usually clearly defined. When it is visible, it is made so by an accumulation of gas immediately beneath the diaphragm, a fortuitous condition which may be reproduced at will by administering, separately, portions of a Seidlitz powder. This procedure, while effective in accomplishing its purpose, may elevate the diaphragm through distention of the stomach and push the heart into

horizontal position, with consequent alterations in MR and ML. t is doubtful if much is gained by full demonstration of the apex. Almost always its outline may be drawn with substantial accuracy ven when done arbitrarily; and frequently aid in fixing its limits s furnished by the beginning incurvation of the left border just efore it blends with the diaphragm.

Since the shadows of other dense organs are superposed on the eart shadow, or contiguous with it, it is never possible to demonstrate the two remaining borders, above and below. They, not being isible, are necessarily drawn according to the discernment and udgment of the observer. When the notch on the right border and he auricular gap on the left can be distinguished, the base line can e drawn in with assurance. Otherwise, the common practice may e followed of joining the lateral borders by a smooth curve continuous with them at their upper ends, remembering that the base ine is not often horizontal, the left extremity lying at a lower level han the right (fig. 2). In either case, as pointed out by LeWald nd Turrell, a part of the left auricle is excluded from the silhouette nd a part of the great vessels included; but it is probable that the rea subtracted approximately equals the area added, and hence the ross area measurement is not greatly affected by the substitution.

Shattuck (13), Bardeen (11), and LeWald and Turrell (3) agree n drawing the lower border, as they do the upper, by joining the wo lateral borders with a smooth curve; but Bardeen, although e describes his curve as "graceful," draws the border rather flatened with sharp curves at either end where it joins the lateral borders, while LeWald and Turrell believe that a more rounded curve epresents more truly the outline of the living heart.

We have preferred to follow Bardeen so that our outlines correpond more closely with anatomical illustrations.

Several observers, in addition to their direct findings, have prented formulae designed to give such data as the volume or weight f the heart and the relations to each other of certain dimensions. hese formulae are not generally quoted in this article, because we ave no means of verifying those relating to the excised organ, and ecause those deduced from averages, having within them the same rors as have the figures on which they are based, seem not to us to of sufficient working value to supplant, or even to supplement, rect tables and graphic curves.

The effect of the position of the body on the size of the heart n not be disregarded. It appears that there is a progressive minution in the size of the heart as the subject changes from the one position to the sitting and from the sitting to the standing, e reduction in changing from the sitting position to the standing

amounting, according to Bardeen, to 3.5 per cent for the transverse diameter and to 7.3 per cent for the area.

Some observers have used one position and some observers the other. Bardeen's studies were carried out with his subjects seated; but the Army X-Ray Manual, which quotes his tables, prescribes the standing position, on the assumption that the error so introduced can be neutralized by omitting the correction normally to be applied for the divergence of the rays. At best, such practice deals unnecessarily with approximations, and it seems better, when comparing sets of tables derived from figures obtained with the subjects in unlike position, to apply the corrections indicated.

The distance of the target from the plate is an important technical point with a direct bearing on the values obtained. If the silhouette is to be of the same size as the contour casting the shadow, the rays must be parallel. Previous workers have chosen a distance of 6 feet or, more commonly, 2 meters (78.74 inches), as giving the closest approximation to parallel rays that is practicable.

At such distance, however, the rays, of course, are not parallel, but diverge from the target so that the silhouette formed is appreciably larger than the contour producing it; and it is frequently desirable to know the absolute size of the contour in order to compare the findings obtained by teleroentgenograms with those obtained clinically, by orthodiagraphy or by autopsy, or with those presented by observers who may have used a different tube distance, or who have converted their silhouette measurements into actual dimensions.

For deriving the true dimensions from those of the silhouette the formulæ are: The true diameter and that of the silhouette are directly proportionate to their respective distances from the target and the two areas are directly proportionate to the squares of their distances from the target. For practical working of these formulæ it may be assumed that the heart contour lies 8 centimeters distant from the plate. Bardeen finds that as a routine for an adult of average size, 6 per cent reduction in the silhouette area, or 3 per cent reduction of a given diameter, will give the actual size of the heart contour with sufficient accuracy; or, the percentage of area reduction may be taken as approximately equal to one-third of the antero-posterior diameter, in centimeters, of the chest during expiration.

For more precise data the position of each heart needs to be determined more exactly. Albers-Schönberg has shown that the greatest transverse diameter of the heart lies in a plane parallel to the front of the thorax and at a distance equal to one-third of the antero-posterior diameter of the chest, at the level of the sixth dorsal ve

ebra. Bardeen has confirmed this, and has shown further that that ontour of the heart which casts the outline of the silhouette is sit-ated practically in the same plane.

These two observations permit a very close estimate of the distance f the contour from the plate, and hence the calculation of the true ize of the contour.

Although most authors have presented tables with corrections nade either for position of patient or for divergence of rays, or both, ve have decided to construct our tables and charts directly from the neasurements of the silhouette.

The principal considerations that determined this course were that ve have used a technic that is essentially standard and recognized s such, and we have, we believe, a sufficient number of observations o establish standards as satisfactory as the method will yield, so hat any one following our technic can obtain figures that may be ompared directly with our standards without the necessity of apply-ng corrective formulæ that tend to complicate the procedure and o introduce new chances for error.

We felt the more free to elect our procedure since we find no niformity apparent in the tables published. Some authors make orrections for divergence of rays and some apparently do not. Some accept the sitting position as standard and use figures derived rom this position, while others either use the standing position or onvert the figures obtained into their corresponding values for the tanding position. Moreover, any who may desire to make correc-ions can do so with the data supplied in the preceding paragraphs.

Hence, in the face of the existing diversity of practice, and as ending to simplify procedure, we have felt justified in presenting our measurements as originally obtained.

DISCUSSION.

A Roentgenologic report on the size of the heart is subject to riticism in two respects. The measurements themselves may be uestioned, owing to technical imperfections inherent in the method, r the conclusions drawn from the figures obtained may be disputed.

The principal source of technical error lies in the impossibility f tracing the complete outline of the heart or of determining with ertainty the sites of the landmarks required for drawing in the bscured borders. As a result the area, the long diameter, and the road diameter are always approximations.

Of different nature, but even more productive of misleading easurements, are the variations in the dimensions of the normal eart that are clearly due to changes in its position and shape, and

the variations in actual size due to the effects of age, occupation, unrecognized disease and other possible influences of which we have no exact knowledge. (Compare fig. 3.)

The most important single factor influencing the position of the heart is probably the position of the diaphragm. The heart, being a mobile organ except for its partial fixation at the base through the attachments of the great vessels, would hang suspended vertically in the chest were it not for the support afforded by the diaphragm beneath. That this is true is attested by the finding of the pear-shaped, "drop-heart," situated almost centrally, that is associated with visceral ptosis, narrow chest, and low diaphragm.

It follows that, according to the degree of elevation of the diaphragm, we shall find one of the three types of heart commonly recognized—the oblique, the relatively vertical, and the relatively horizontal. How extreme this variation in the direction of the long axis of the heart may be, is shown in B. Smith's series in which the angle between the transverse and long diameters varied from 23° to 63°.

It is obvious that as a heart approaches the horizontal, TD tends to coincide with LD and thus be increased, so that MR, ML, and TD are measurements the values of which are largely dependent on the relation of the axis of the heart to the axis of the body, and they may in consequence fail signally to represent the actual size of the heart—certainly when there is any wide departure from its normal position. Indeed, Bardeen (188 cases) discards these dimensions, owing to their excessive variations, in favor of the area; and Cohn (208 cases), although he considers TD a satisfactory measurement, believes that the range of the observed measurements interferes with the usefulness for the clinic of standard and average curves.

In spite, however, of the variations met with in TD and its components, observers have generally been reluctant to abandon them, since they alone are objectively obtained, and since they are found to be practically of value, notwithstanding their variations, being as useful as and less uncertain than the long diameter or the area. (Cohn, Le Wald, and Turrell.) It therefore seemed desirable to retain these measurements provided they could be supplemented by corrective data as to angle. This we have done in chart 11.

A gratifying uniformity in the increments was obtained, it proving possible to employ straight lines, uniformly spaced, to indicate the correction for angle.

An example will indicate the method of using the chart: An individual is found to have a surface area of 1.74 (see chart 9), and the cardiac angle is 40°. One then follows up the vertical line from the base point, 1.74, until it meets the oblique angle line 40. That point

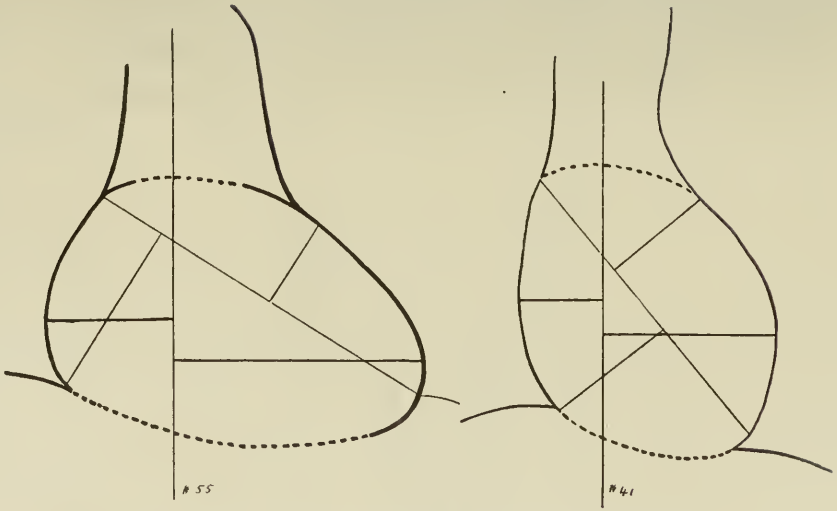


FIGURE 3.—Two outlines showing diverse types of silhouettes.

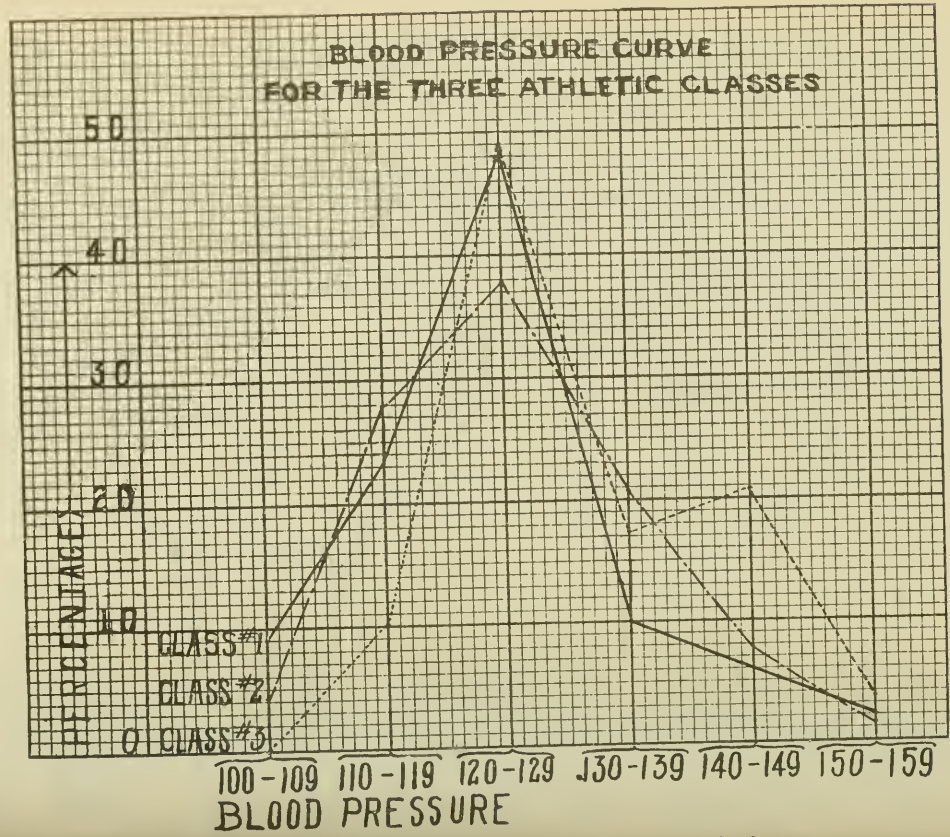


FIGURE 4.—Blood pressure curve for the three athletic classes.

is at the level of 12.4 centimeters, which is the normal TD for that individual.

The normal diversity in the shape of the heart influences, not less than position, the significance to be attached to measurements of the diameters.

It is known that there are heavily muscled individuals, short and stocky, with thick, broad chests, and that there are slender individuals with long, narrow chests—the herbivorous and carnivorous types of Goldthwaite—and it has been frequently remarked that the normal heart found in each of these types conforms in general configuration to the body which contains it. In fact, Kreuzfuchs early presented a formula for comparing TD with the transverse diameter of the thorax: and Danzer (17) advocates employing a cardio-thoracic ratio, to the exclusion of tables of dimensions, on the ground that it is more informative.

Danzer has observed that if the transverse diameter of the silhoutte is less than one-half the internal diameter of the thorax, the heart is not enlarged, and expresses this relationship numerically by a ratio obtained by dividing the transverse diameter of the heart by that of the thorax, taken at the level of the nipples, or in the space below, if the diameter there is greater, and measured to the inner borders of the ribs. He found the ratio to average 45 per cent, with variations of from 39 to 50 per cent, a ratio of 53 per cent or over being considered pathological.

Danzer points out certain defects in the method, but, nevertheless, maintains its usefulness, and is supported in this position by Martin (18), who concludes that the ratio gives as much information concerning the size of the heart as do the various tables, and by Lee and Holmes (16). Pfahler also appears to employ such a ratio in making his cardio-vascular reports (15).

We have not equal confidence in the method. Having computed the ratio in 410 of our cases, we found the average to be 49.5 with variations of from 36 to 57. Since 60, or 14.6%, of our normal subjects present a ratio of 53 or over we can not subscribe to that figure as the pathological point. Moreover, it appears that in the wide range of figures obtained this method contains the same fundamental defect as do those methods dealing with interior dimensions, and for the same reason—a feature which is discussed at greater length on pages 237 and 238. On the whole, therefore, we believe the cardio-thoracic ratio to be rather less indicative of the relative size of the heart than are tables of dimensions, its only advantages being the ease of reckoning and the dispensing with all reference tables.

A correlation similar to that between the shape of the heart and that of the chest has been noted between the shape of the heart and

the direction of its long axis, the oblique heart being usually ovoid, the vertical heart longer and narrower, and the horizontal heart boot-shaped. This, however, is probably the same correlation observed from another point of view, since it is in the narrow chest that we find the vertical heart and in the broad chest the horizontal heart.

Obviously, in dealing with hearts showing these dissimilarities of pattern, the area determination should furnish a means of comparing their size, whatever their position or shape, that is free from the errors inherent in measurements of the transverse diameter. But the impossibility of fixing the position of two of the four borders leads most observers, Bardeen excepted, to place little reliance on the area estimation.

Similarly, it might be supposed that in the case of two hearts of the same actual size, one long and narrow, the other short and broad, there would be some correspondence between their LD and BD, or certain of their derivative formulæ. But these dimensions, with the area, depend on the arbitrary placement of the upper and lower borders, and their usefulness is likewise impaired.

It may be that the variations in shape described are more apparent than real, and that the several type shapes may be only incident to the position of the heart, since it appears that there is a correlation between the shape of the chest and the position of the diaphragm—the diaphragm being lower in long, narrow chests and higher in broad, flat chests—so that possibly the vertical heart of the long, narrow chest is less an anatomical congruity than the natural result of a low diaphragm. It is certain, too, that when the patterns of apparently unlike hearts are cut out and superposed on the same long axis, the dissimilarities of pattern disappear in large part.

Hence, when we take into account the inaccuracies inseparable from LD, BD, and the area, and the limited real divergences of pattern, we feel that we rely on TD, when corrected for the angle of deviation, to serve as the best basis for comparing the size of hearts showing diversity of shape as well as variation in position. (See table, p. 237.)

We have spoken of the variations in the dimensions that are obviously dependent on unusual position or shape, and we now come to the variations in the actual size of the heart that result from age, occupation, unrecognized disease, and other more obscure factors.

Although the effect of the age factor per se has not been separated from that of other factors incidental to increase in years, there is no doubt that the heart does increase in size with advance in years, and Bardeen gives separate tables for the ages of 20, 30, and 50. We however, are not in a position to submit any data regarding the effects of age, nor have we considered it necessary to give the ag

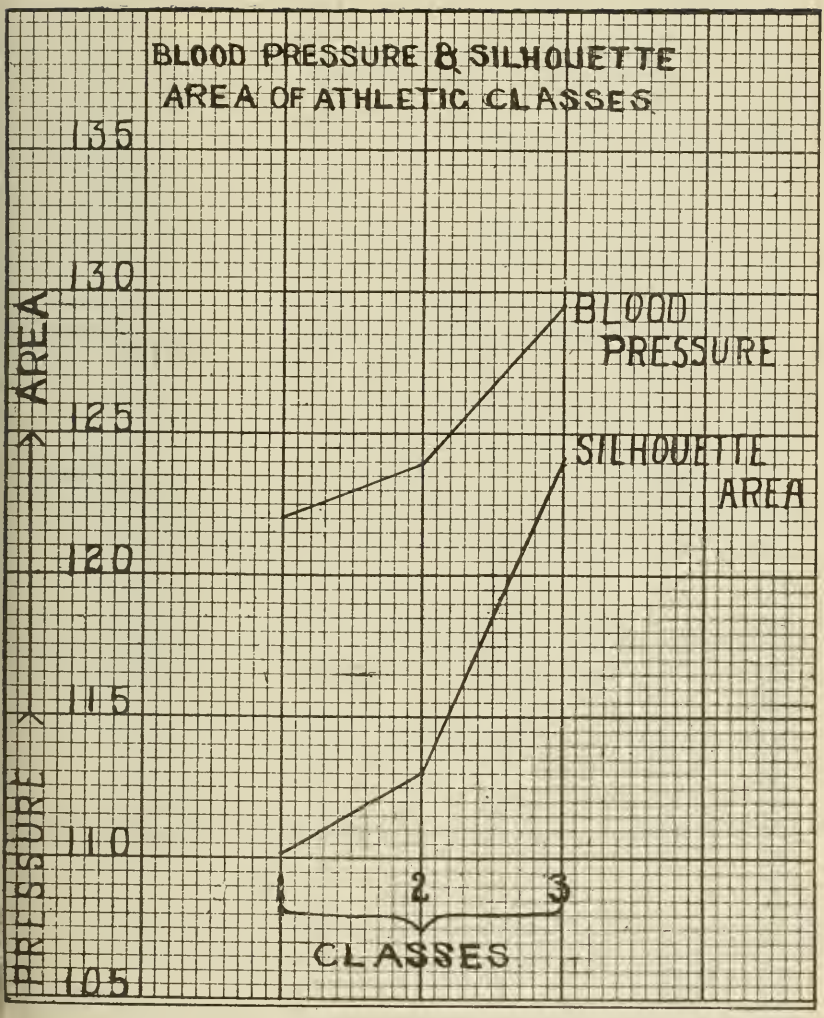


FIGURE 5.—The average blood pressure and the average silhouette area of the heart in the three athletic classes.

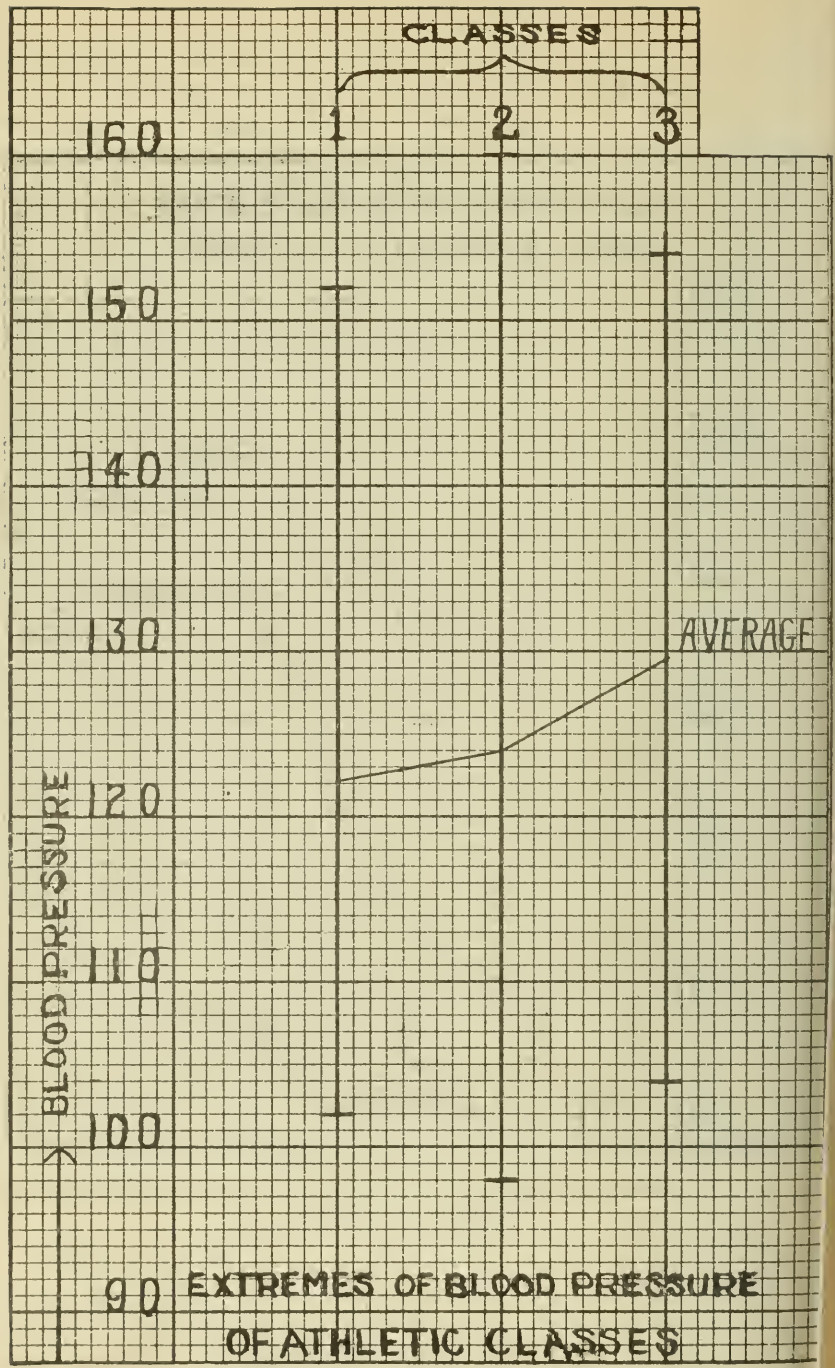


FIGURE 6.—The blood pressure curve for the three athletic classes.

factor any weight in our tables, since the age range in our series is from 16 years and 8 months to 22 years and 8 months. Doubtless, before applying our standards for persons of more advanced years, it would be necessary to make a due allowance.

The factor of unrecognized disease requires mention only; but there are certain disease tendencies, some imperfectly understood and often difficult of recognition in their prepathologic stages, that, being of frequent incidence and probably capable of increasing the size of the heart to the degree of abnormality, deserves fuller consideration than we have been able to give them. An example in point is the "hypertensive diathesis" (19).

In order to ascertain the effect of occupation on the size of the heart, directly or indirectly through possible habitual hypertension, the individuals in this series were divided into three classes, established on the basis of the amount of athletic activity.

Class I includes midshipmen who have engaged in practically no athletic exercises beyond the required drills.

Class II includes those who participate in athletics to a moderate degree, they not being on the regular athletic squads and not in training for any prolonged periods.

Class III embraces those whose participation in athletics is particularly active and constant, and includes the men on the regular squads for football, baseball, track, and crew.

Chart, figure 4, shows the average blood pressure for these three classes, and the extremes in each class. The average blood pressure for Class I was 122 millimeters, with extremes varying from 102 to 152 millimeters; the average pressure in Class II was 124 millimeters, extremes 98 to 160; the average in Class III was 130 millimeters, extremes, 104 to 154. It would appear from this chart that the individual who indulges in strenuous athletics becomes subject to a definite increase in blood pressure, although the average increase is only eight millimeters.

Chart, figure 5, shows the average blood pressure and the average silhouette area of the heart of the three athletic classes. The average silhouette area for the three was, respectively, 110, 113, and 124 square centimeters.

Chart, figure 6, shows the blood pressure curve for the three classes. It appears from this chart that the highest percentage of midshipmen in all classes fall in the same blood pressure group, that of 120–129, but it is noteworthy that 21 per cent of Class III show a blood pressure of from 140 to 149 millimeters.

From a survey of these charts it appears that we may expect a moderate increase in blood pressure, and in the size of the heart, in individuals who engage for several years in strenuous athletic exercise.

When, however, one views the range of measurements obtained in such a large series of healthly young men, it would appear that none of the several conditions noted as being recognized factors leading to increase in the size of the heart is adequate to account for the occurrence of such extreme variation. It seems necessary to fall back for explanation on factors which are at present unknown, or too obscurely related for their influence to be demonstrated. One thinks in this connection of endocrine imbalance, racial derivations, familial heredity, and congenital or infantile influences, but as yet any such explanations are purely speculative and must be so regarded.

BASIS FOR GROUPING (METABOLIC TISSUE MASS).

It is clear that if satisfactory norms are to be evolved from groups, the basis of the grouping must be some characteristic which is subject to direct measurement, and which bears a constant and uniform relation to the size of the heart.

In considering possible reasons for apparent variations in the size of the heart, other than those already mentioned, we have recognized a probable fallacy resident in the custom of employing height or weight as the basis for grouping individuals to establish norms, and as the guide to what the measurements of an individual should be. Neither height nor weight fulfills the two basic requirements. While they can be measured, it seems demonstrated conclusively that neither separately indicates at all closely the size of the heart; and that averaging figures obtained from them is a questionable expedient. When these data are used in conjunction, that is, when the groups are formed of subjects of like height and weight, it may be inferred that greater uniformity in results would be gained; but such a system entails the formation of an unwieldy array of groups, with so few individuals in each group as to weaken the averages. So far as we know this method has not been employed.

While searching for a basis for grouping better than those hitherto used, it appeared to us that the procedure promising most—should it prove practicable—was to go to the root of the matter and ascertain the attribute principally determining the size of the heart, with the ultimate object of dealing directly with this determinant, rather than with factors that are subsidiary and less uniformly related.

As having a bearing on the identification of this controlling bodily characteristic, we associated an illuminating remark by Bardeen, who, having noted that smaller heart silhouettes appear in fat persons, states "The size of the heart is determined rather by the development of the skeletal musculature than mere body weight," with

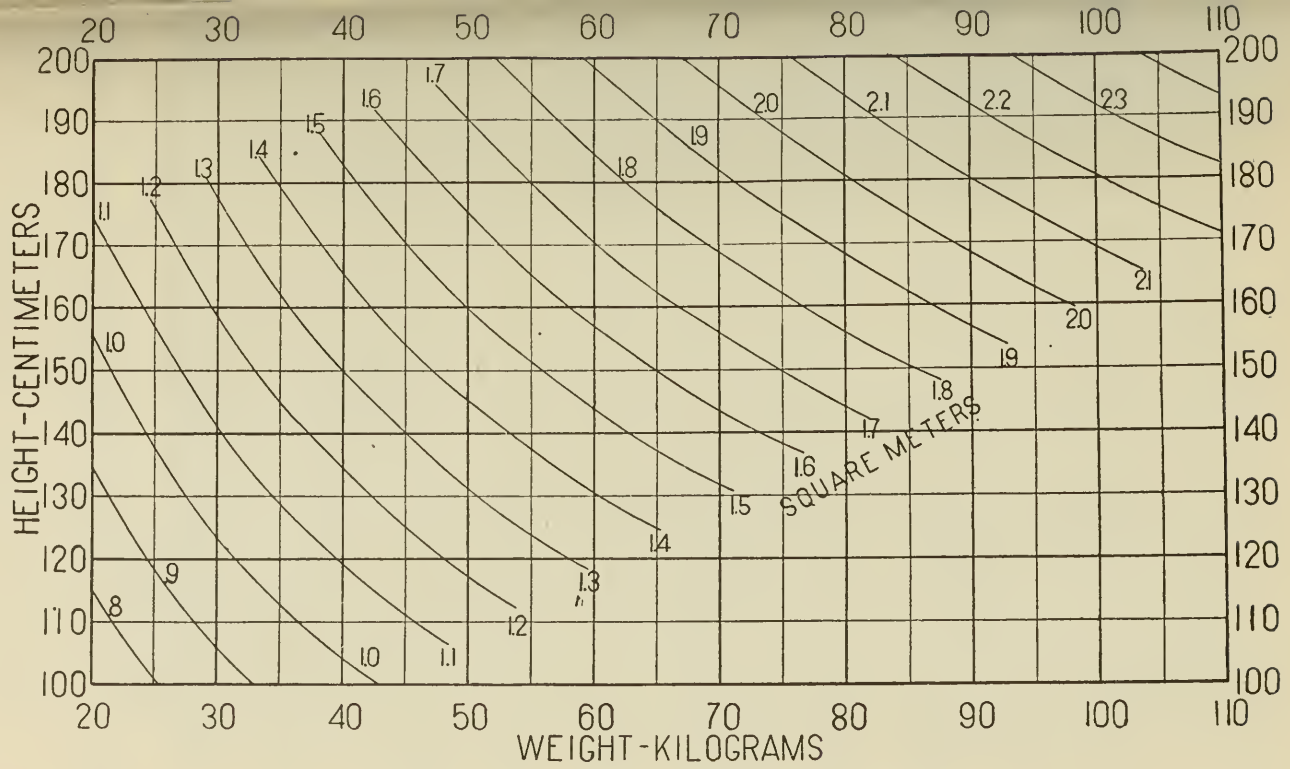


FIGURE 7.—Chart for estimating the surface area of the body.

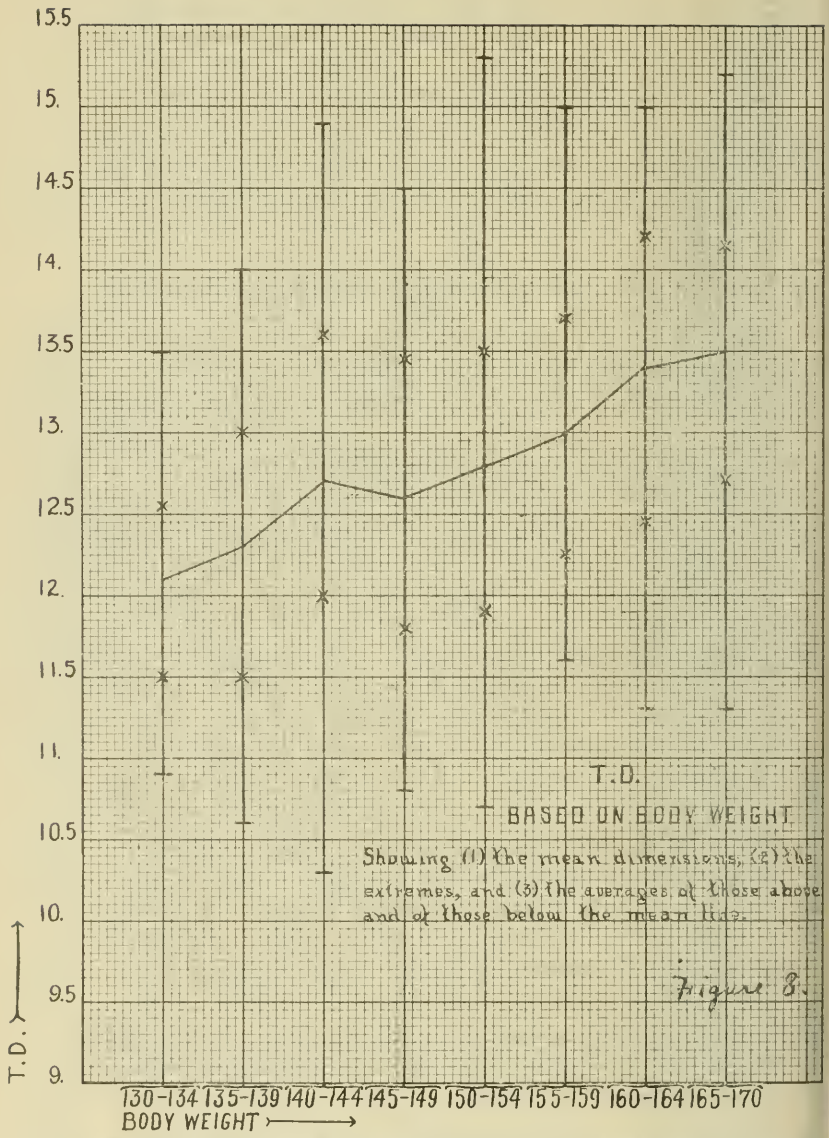


FIGURE 8.—Showing the mean dimensions, the extremes, and the averages of those above and of those below the mean line.

what we deem the essential cause of the failure of height-weight classifications to evolve satisfactory norms, namely, their neglect to take reckoning of the proportion of such tissues as fat and bone which exhibit low metabolic activity and consequently make little demand on the heart.

Following this lead, we have arrived at an opinion that is substantially in agreement with that of Bardeen, but is, we believe, in fuller accord with our knowledge of physiology, in that we do not limit this defining force to the skeletal musculature, but regard, as the chief determinant of the size of the heart, the total amount of actively functioning protoplasm. If this opinion is well grounded, the amount of such tissue should itself constitute the satisfactory basis for grouping we require, provided it is subject to direct measurement.

Fortunately, we have a means of estimating very accurately the relative amounts present in individuals—a means made available by workers in metabolism who have investigated the relation existing between the height, weight, and surface area and the basal metabolism. We can appropriate their findings, since the normal basal metabolic rate is dependent on the amount of actively functioning protoplasm: One varies with the other, and what serves as the index of one will serve equally well as the index of the other.

From a survey of their work, it may be stated (Macleod) that the surface area law gives constant results for the energy output of laboratory animals, and, except with cases who are emaciated or corpulent, gives a much more accurate basis than body weight for comparing individuals. Since, however, the surface area law does not hold for the emaciated and the corpulent, the only safe method to employ in comparing the metabolism of normal and diseased persons is that called by Benedict "the group method," in which the metabolism of groups of persons of like height and weight is compared.

As the first step then toward demonstrating the assumed correspondence between the mass of actively functioning tissue and the size of the heart, we have ready at hand, in the surface area, an index of the amount of such tissue—an index which can be obtained at a glance with such simple data as height and weight, and which is so accurate, except for the emaciated and the corpulent, that it yields an average error of only 1.5 per cent (10). Although the figures obtained are always relative, they fulfill, as well as do absolute values, the two requirements of serving as a basis for grouping and as a guide to the measurements to be expected in an individual.

The formula for estimating the surface area is as follows:

$$A = W^{0.425} \times H^{0.725} \times C$$

A being the surface area in square centimeters, H the height in centimeters, W the weight in kilograms, and C the constant, 71.84. A chart based on this formula has been constructed whereby the surface area may be ascertained at a glance (fig. 7).

For this formula and the chart we are indebted to Du Bois and Du Bois (10).

In pursuance of this principle of using the surface area of the body as the basis for grouping, we have constructed charts for the transverse diameter, the long diameter, and the silhouette area, the charts showing the mean of the dimensions obtained in each group, the average of the departures above and below the mean, and the range of the extremes.

We were much disappointed in that these charts, based on the surface area, fell far short of our expectations. While the mean dimensions, when plotted out, made admirably straight lines, with even progression of values for each increment in surface area, the individual measurements showed little tendency to be grouped, being, on the contrary, scattered through a wide range. This is well shown in chart, figure 13.

However, we found on comparing charts based on surface area with corresponding charts based on body weight that the average departures and the extremes were nearer the mean in the surface-area charts. In other words, the variations in the surface-area groups were less than in the body-weight groups. This is shown in the following table:

	Based on body weight.	Based on surface area.
Transverse diameter:		
Average departure.....centimeters..	+0.72	+ 0.7(
	−0.78	− 0.7
Average of extremes.....do....	+1.87	+ 1.6(
	−1.86	− 1.4
Silhouette area:		
Average departure.....square centimeters..	+10.2	+ 9.7
	− 9.5	− 8.7
Average of extremes.....do....	+22.7	+23.2
	−22.3	−22.0

Although it is evident that there is in the charts based on surfac area somewhat less variation from the mean than in the charts base on the body weight, we can not but feel that the advantage gaine by employing surface area is too slight to make worth while th determination of the surface area, easy as that is. We have, ther to offer as a basis for comparison nothing that is materially superio to the body weight.

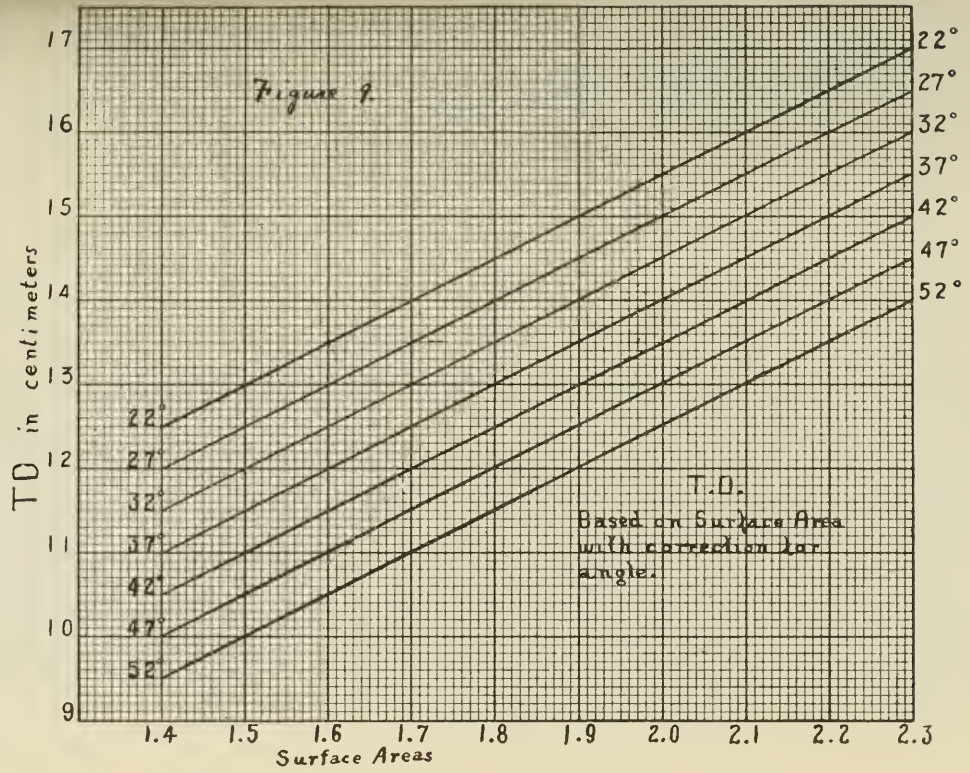


FIGURE 9.—T. D. Based on surface area with correction for angle.

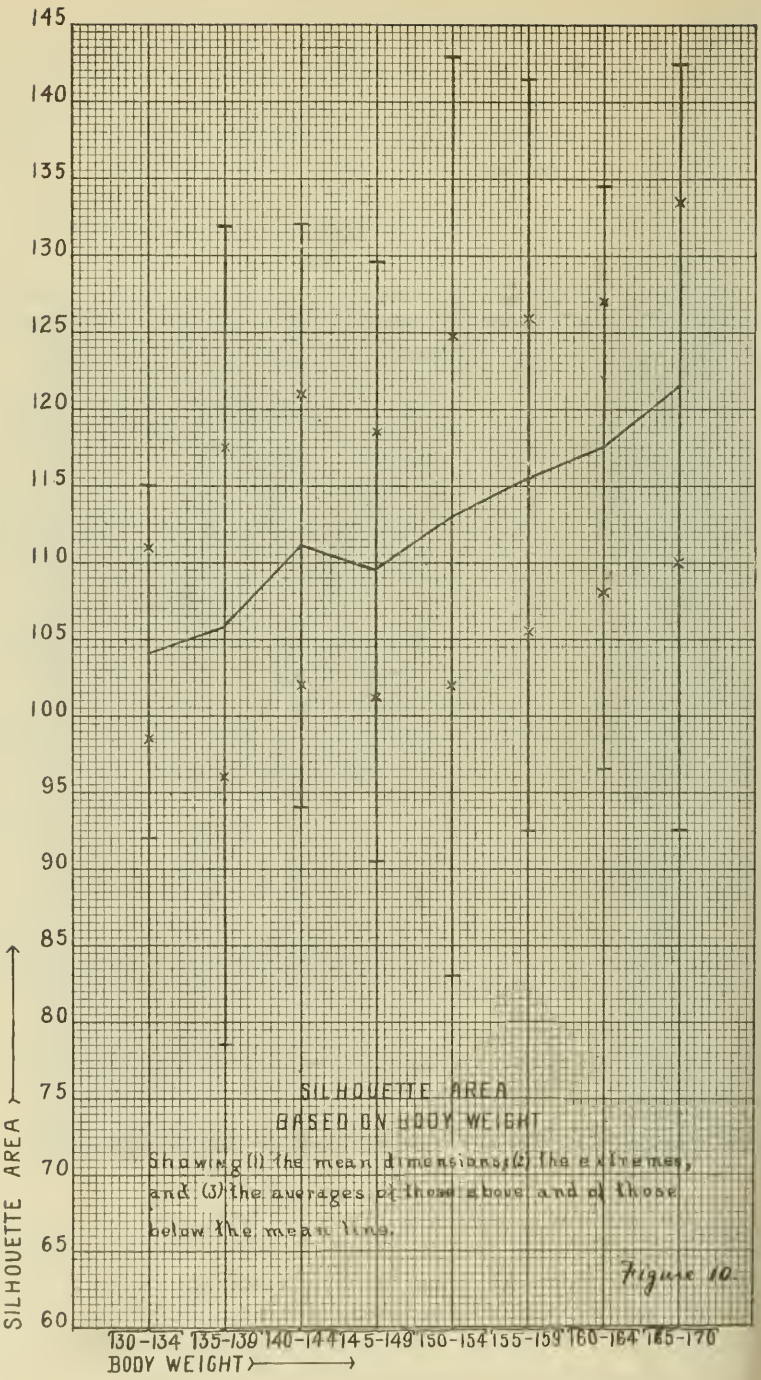


FIGURE 10.—Silhouette area based on body weight.

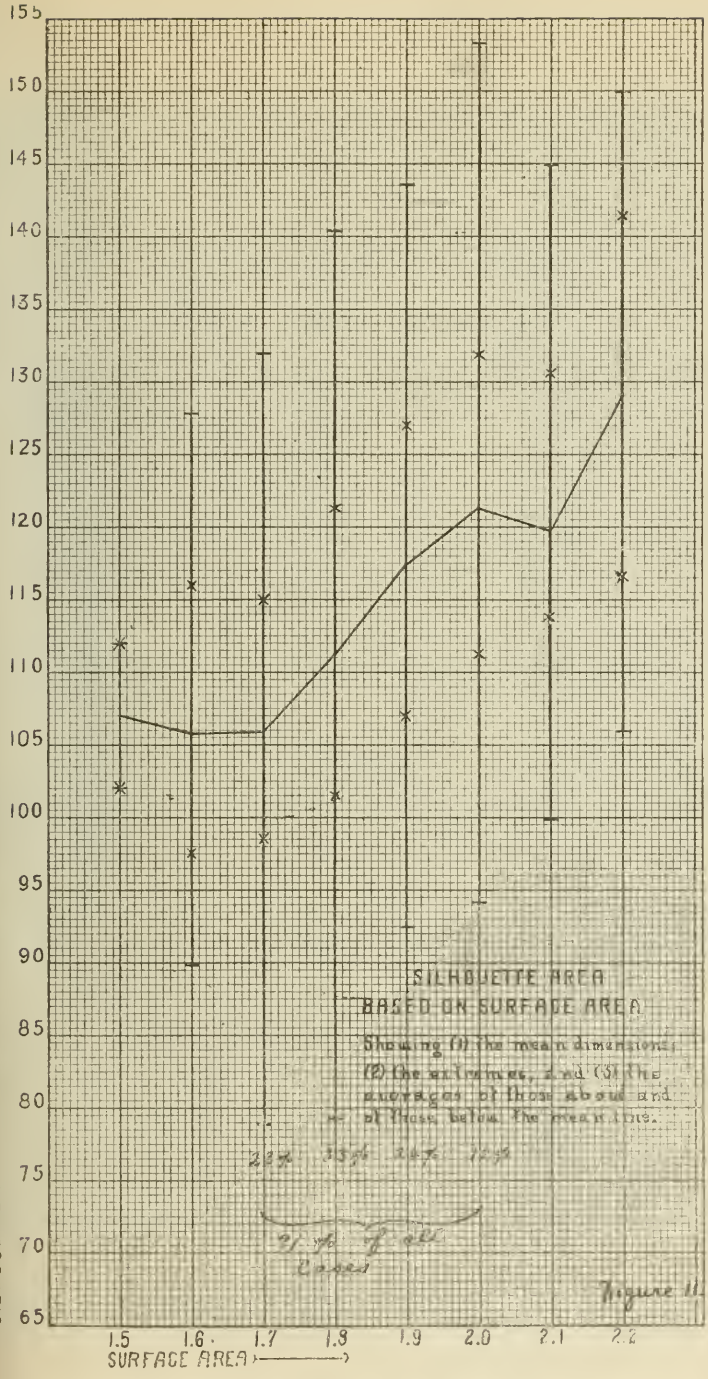


FIGURE 11.—Silhouette area based on surface area.

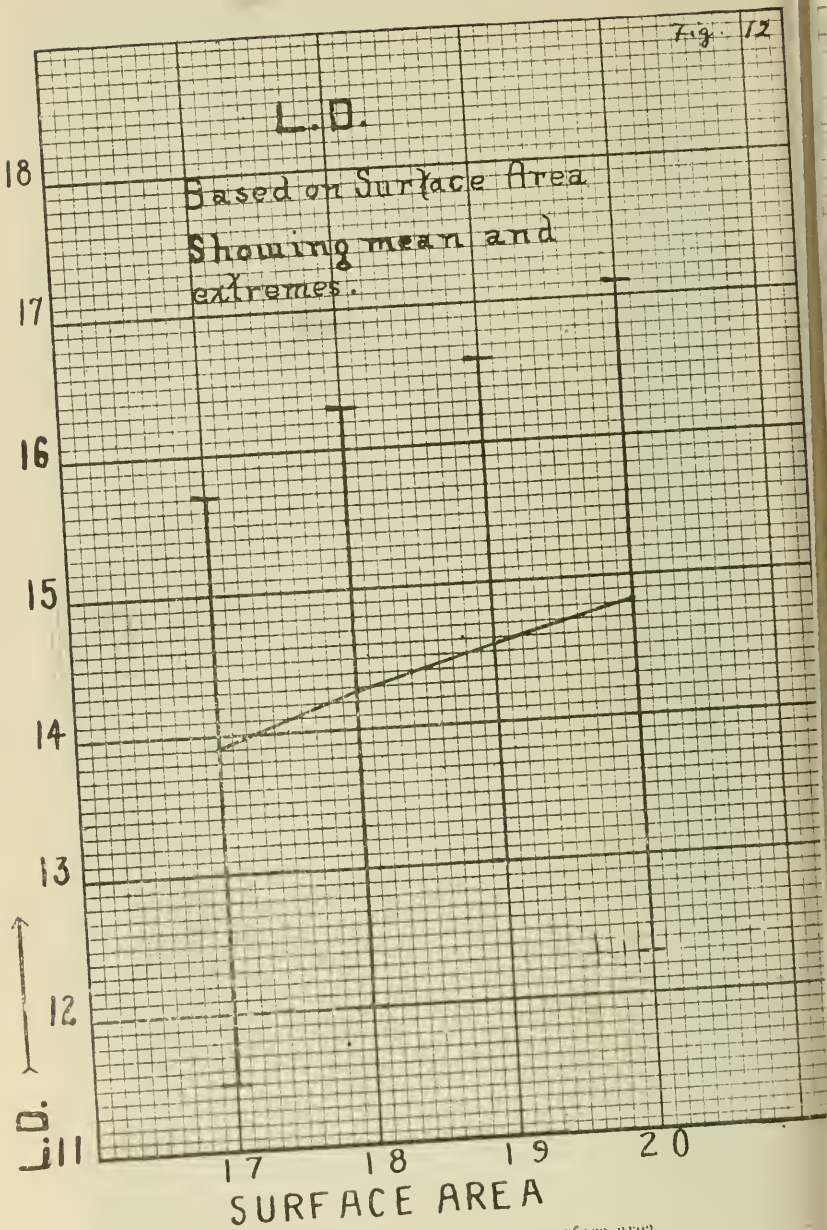


FIGURE 12.—L. D. Based on surface area.

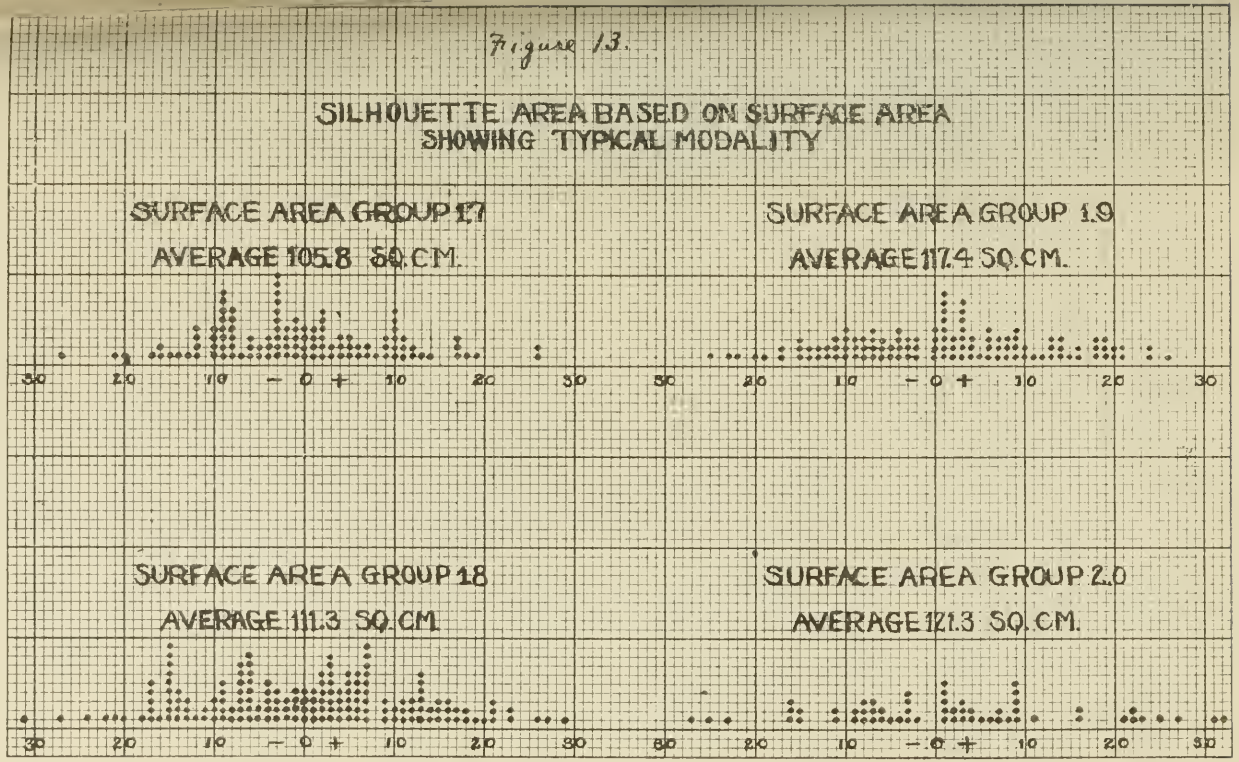


Figure 13.
SILHOUETTE AREA BASED ON SURFACE AREA
SHOWING TYPICAL MODALITY
SURFACE AREA GROUP 1.7
AVERAGE 105.8 SQ.CM.
SURFACE AREA GROUP 1.9
AVERAGE 117.4 SQ.CM.
SURFACE AREA GROUP 1.8
AVERAGE 111.3 SQ.CM.
SURFACE AREA GROUP 2.0
AVERAGE 121.3 SQ.CM.
30 20 10 − 0 + 10 20 30

FIGURE 13.—Silhouette area based on surface area.

COMMENT ON FINDINGS.

The observations made on the transverse diameter, the long diameter, and the silhouette area have been charted, and are reproduced in figures 8 to 13, inclusive. Our averages, when plotted, make very satisfactory lines, there being a fairly uniform increment in each dimension for each increase in body weight or in surface area. The fundamental defect in the method is, however, immediately apparent in the wide range of measurements obtained even in a group of subjects as homogeneous as ours is. The subjoined table and that on page 31, together with the charts, demonstrate how great in centimeters and percentages the range is. With such elastic standards, comparisons are valueless.

	T. D. based on body weight.	Silhouette area based on—		Cardio-thoracic ratio.
		Body weight.	Surface area.	
Above the mean:	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Extreme departure	14.6	19.2	19.8	16
Average departure	5.5	9.2	8.4	.....
Below the mean:				
Average departure	6.1	8.1	7.4	.....
Extreme departure	14.3	18	16.6	20

A variation exceeding that normal for the patient by more than 10 per cent is mentioned in the Army Manual (p. 418) as furnishing, in conjunction with symptoms, "a fair probability of pathology." Applying this rule to 444 of our cases, we found that 18.7 per cent of these normal subjects exceed this limit; that 34.2 per cent fall within it, and that 47 per cent being below the mean, are cases in which only extreme enlargement would be manifest in the dimensions.

The practical bearing of this variability is plain. A heart, originally very small, can enlarge enormously before it exceeds the maximum dimension in its group, and, on the other hand, a heart naturally large passes the normal maximum with the slightest increase in size. Referring to chart, figure 11, we see that the average silhouette area for the 1.8 group is 111 square centimeters. The heart represented by the smallest area observed, approximately 80 square centimeters, might enlarge as the result of disease 38 per cent before it attained the average of its group, and 75 per cent before it equaled the maximum. As Danzer says: "A small heart (Tropfer Herz) may, in spite of a severe aortic regurgitation, * * * still remain smaller than the standard diameter for the average normal." Whereas mensuration of the heart represented by the largest area observed, 140 square centimeters, might lead to attaching the gravest significance to heart symptoms in reality trivial.

It must likewise rarely be possible, from inspection of a teleroentgenogram, to state with assurance that any individual chamber is enlarged, or that hypertrophy of the walls of a chamber exists. The diversity in normal outlines exhibited must always tend to undermine one's confidence in the significance of the most marked abnormalities of shape; and information as to hypertrophy is especially unlikely to be forthcoming, since it is possible for the walls of the heart to treble in thickness without producing appreciable alteration in the size or the shape of the silhouette.

Hence, it appears to be clear that while we can ascertain accurately the size and shape of any heart, we have no means whereby we may know what the size and shape of that particular heart ought, in the absence of disease, to be. In this respect our results correspond with those of other observers so strikingly we must believe the heart in normal individuals to be so variable in size that it must rarely be possible to state from a single observation whether a given heart is or is not enlarged.

Since this failure to evolve usable standards is not peculiar to the method employed, but is plainly due to unexplained variations in the organ observed, it seems impossible to limit the application of our findings to teleroentgenology. Thus, regardless of the method by which the actual size of the heart be estimated—whether by teleroentgenography, fluoroscopy, orthodiagraphy, electrocardiography, or manual percussion—and regardless of the degree of precision displayed by these several methods, we can not escape the conclusion that, in view of the great variations in the size of the normal heart, any judgment as to the relative size of a given heart must be fallacious in the extreme. We are tempted to take sides with Lewis in his belief that the position of the apex beat indicates as well as any means at our command the relative size of the heart.

CONCLUSION.

1. The method employed does not furnish satisfactory standards by which to determine if the heart is abnormal in size.

2. The failure being due not to method, but to great and unexplained variability in the organ studied, the difficulty will remain, whatever means be used to ascertain the size of the individual heart under observation.

3. Hence any conclusion as to the relative size of a heart based on comparative dimensions, ratios, or relations to body landmarks is fallacious and should be applied clinically with great reserve.

REFERENCES.

1. Claytor and Merrill: Am. Jour. Med. Sc., 1909, p. 554, quoted in Holmes and Ruggles.

2. Holmes and Ruggles: Roentgen Interpretation, 1919.

3. LeWald and Turrell: The Aviator's Heart. Roentgen Ray Studies. merican Journal of Roentgenology. February, 1920, p. 67.
4. Cohn: An Investigation of the Size of the Heart in Soldiers by the Tele- ntgen Method. Archives of Int. Med., May, 1920, p. 499.
5. Bertnard Smith: Teleroentgen Measurements of the Hearts of Normal oldiers. Arch. Int. Med., May, 1920, p. 522.
6. Bertnard Smith: Teleroentgen Estimations of Heart Size in cases of ffort Syndrome. Arch. Int. Med., May, 1920, p. 532.
7. United States Army X-Ray Manual. 1919.
8. Eyster & Meek: Am. Jour. Roentgen. October, 1920, p. 471.
9. Macleod: Physiology and Biochemistry in Modern Medicine. 1919, p. 539.
10. DuBois, Delafield, and DuBois, E. F.: A Formula to Estimate the Ap- roximate Surface Area if Height and Weight be Known. Arch. Int. Med., art II, vol. 17: 863, June, 1916.
11. Bardeen: Am. Jour. Anat. 23: 1918, p. 423.
12. Bardeen: Am. Jour. Roentgen 4: 1917, p. 606.
13. Shattuck: Boston M. & S. Jour., March 2, 1916; vol. 174, p. 301 and p. 384.
14. White: Diagnosis of Chronic Valvular Disease. J. A. M. A., 30 April, 21, p. 1207.
15. Pfahler: Jour. Am. Med. Assn., Jan. 1, 1921, p. 19.
16. Jacobs & Worster: U. S. Naval Med. Bulletin. July, 1921, p. 524.
17. Danzer, Am. Jour. Med. Sc., April, 1919, p. 513.
18. Martin, Am. Jour. Roentgenology, June, 1921, p. 295.
19. Alvarez, Arch. of Int. Med., October, 1920, p. 381.

PHYSICAL DEVELOPMENT OF MIDSHIPMEN.[1]

By E. B. Taylor, Lieutenant, Medical Corps, United States Navy.

The essential difference between the Naval Academy and other stitutions of this country lies in the fact that it prepares its men irectly for positions as officers in the United States Navy. It re- uires for entrance a thorough physical as well as mental examination ased on a standard selected minimum average for age. After the pplicant has passed this examination, his condition speaks for self.

It becomes the duty of those who control and direct the institution o employ every means in their power to train and develop these oung men, in order that they may be better fitted to carry out their mportant life mission. Executive officers attached to the United States Naval Academy are selected from those whose abilities are of hat character that qualify them for this duty. Medical officers are lso assigned, and their activities are synchronized with the executive epartment. Skilled instructors are chosen from both service and ivilian life for didactic work. All of these are aided and augmented y the work of physical instructors and trainers whose duty it is to uild up and maintain at its highest rate of efficiency the condition

[1] Reprinted from the Nation's Health, September, 1921.

of the midshipmen. As in any other enterprise, it is only through the synergistic action of those concerned that the best and the desired results are obtained.

As this article is dedicated to the physical side of the midshipmen's life, it will be necessary in great measure to lose sight of the executive standpoint, and look at it more from the angle of the medical man, who is the one concerned with sickness and health, and largely with the physical condition of the midshipmen. The administrative and medical heads work together, so that each has cognizance of the other, and what is done is through recommendations and action with full consideration of all concerned in order that the best results may be obtained. The medical officers come in contact with the midshipmen in all their activities, and are so disposed as to cover every field.

As has been said, the first important duty in connection with the young men is to determine the fitness of the applicant for entrance. Each applicant must pass a prescribed physical examination, and when found qualified, being robust and of good constitution, he formally enters the Academy. Quoting from the regulations governing the admission of candidates to the Naval Academy:

"Candidates are required to be of good moral character, physically sound, well formed, and of robust constitution. Any one of the following conditions will be sufficient to cause the rejection of the candidate, viz:

"(*a*) Feeble constitution, inherited or acquired.

"(*b*) Retarded development.

"(*c*) Impaired general health.

"(*d*) Decided cachexia, diathesis, or predisposition; anemia, from malaria or from intestinal parasites, as hookworm.

"(*e*) Any disease, deformity, or result of injury that would impair efficiency, such as (*ea*) Weak or disordered intellect; (*eb*) Cutaneous or communicable disease; (*ec*) Unnatural curvature of the spine, torticollis, or other deformity; (*ed*) Inefficiency of either of the extremities or large articulations from any cause; (*ef*) Epilepsy or other convulsions within five years.

"(*f*) Impaired vision, disease of the organs of vision, imperfect color sense; visual acuteness must be normal, i. e., 20/20 for each eye without the aid of glasses. There should be no deviation from this standard.

"(*g*) Impaired hearing or disease of either ear. The organs of hearing, both conductive apparatus (outer and middle ear) and the percipient apparatus (internal ear), must be free from disease. In testing the hearing of the candidate, the voice, the ticking of a watch and, if practicable, Politzer's acoumeter shall be employed.

"The voice is a more reliable method of determining the acuteness of hearing than the ticking of an ordinary watch, as it allows for variations in hearing, with the modifications produced by changes in pitch and tone. Hearing in each ear must be normally acute to the spoken and whispered voice. In examining the acuteness of hearing with the voice, one ear of the candidate should be closed while the other ear is being examined, and his eyes should be covered to prevent lip reading. The ticking of an ordinary watch should be heard a distance of 40 inches.

"(*h*) Chronic nasal catarrh, ozena, polypi, or great enlargement of the tonsils.

"(*i*) Impediment of speech to such an extent as to impair efficiency in the performance of duty.

"(*k*) Disease of heart or lungs or decided indications of liability to cardiac or pulmonary affections.

"(*l*) Hernia, complete or incomplete, undescended testis.

"(*m*) Varicocele, sarcocele, hydrocele, stricture, fistula, hemorrhoids, or varicose veins of the lower limbs.

"(*n*) Phimosis, and diseases of the genito-urinary organs.

"(*o*) Ingrowing nails, bunions, cross or hammer toes, flat feet, or other deformity of feet.

"(*p*) Loss of many teeth, or teeth generally unsound. Marked overbite, or lack of occlusion of jaws. There should be at least eight opposing molars, two on each side in each jaw. All defective teeth should have permanent fillings. Much time can be saved by previous attention to this requirement.

"Attention will also be paid to the stature of the candidate, and no one manifestly undersize for his age will be received at the academy. The height of the candidates for admission shall not be less than 5 feet 2 inches between the ages of 16 and 18 years, and not less than 5 feet 4 inches between the ages of 18 and 20 years; and the minimum weight at 16 years of age shall be 111 pounds, with an increase of not less than three pounds for each additional year, or fraction of a year over one-half. Any marked deviation in the height and weight relative to the age of the candidate will add materially to the consideration for rejection.

"The decision of the medical board, especially ordered by the department for the examination of candidates for entrance to the Naval Academy, upon the physical qualifications for admission, will be final.

"Medical officers are required to examine physically any candidate for the Naval Academy who may appear with a letter from a Member of Congress so requesting. Special attention will be given to the following defects or disabilities: Flat feet, defective vision or hear-

ing, heart or lung trouble, and disease of the kidneys. The candidate should be informed of the result of the examination and a copy of the report of examination shall be forwarded to the Member of Congress concerned and a duplicate report to the Bureau of Navigation. Each examination report shall show the name of the Senator or Representative requesting the examination.

"Medical examiners should bear in mind that the primary object of this examination is to eliminate those who are obviously disqualified, rather than to give assurance to any candidates that they will subsequently pass the official examination. For example, candidates who appear with rapid heart action, without organic lesion, shall be informed that unless such condition is temporary they will probably be rejected. Candidates having varicocele, hemorrhoids, varicose veins, or other minor surgical defects of remediable nature should be informed that they will probably be rejected unless these defects are corrected by operation.

"In every border line case where the examiner himself is uncertain as to the outcome, candidates and Members of Congress should be clearly informed that the case is a doubtful one.

"In the examination of candidates for admission as midshipmen into the Naval Academy, medical officers shall be governed substantially by the instructions contained in the Navy Regulations relating to the physical examination of recruits.

"A high standard of physical excellence is essential in the cases of all candidates presenting themselves for admission to the academy, and medical officers should always keep in view the fact that the future physical efficiency of officers of the Navy will depend largely upon the manner in which this important and exacting duty is performed by the board.

"A careful urinary analysis shall be made in the case of every candidate undergoing examination. The urine shall be tested qualitatively and, if deemed necessary, quantitatively for sugar and albumin. Where albumin exists in appreciable quantity a microscopic examination shall be made. These examinations are carried out by a permanent medical board having as its head the senior medical officer of the station, who is director of all medical activities."

Immediately after entrance each midshipman of the entering class is given the "Strength Test," with the use of the Kellog Universal Dynamometer. When the dynamometers were first installed here they were standardized by running off tests of more than one thousand midshipmen, and averages taken and designated according to the various heights—62 inches being the minimum allowance. In this manner a standard anthropometric chart has been prepared and is used for all midshipmen. It contains in appropriate columns according to height, the strength units required of each of the 4

muscle groups tested, and shows the standard of strength required for midshipmen of the first or graduating class. An allowance of 1 inch, not to fall below the requirements for 62 inches in height, is made for the second class; 2 inches for the third, and 3 inches for the fourth class. Failure to attain the required number of strength points in any one muscle group constitutes a defect. A chart is made out for each man, with the defects noted in the proper column, and this chart kept on file in the office of the gymnasium medical officer. Whenever a man's chart shows defects he is regarded as weak, and a course of exercises and physical training is prescribed for him. These exercises are designed to correct the weak muscles. After this course of training he returns for another test of these defective groups.

When the defects are corrected he is no longer regarded as weak and his chart is held over until the following year. If at the end of the year, however, he is still found defective, he must utilize a part of his September leave in bringing up these deficiencies. On the back of each chart is tabulated the corrective exercises for the defective muscles. Each muscle group is named, and opposite is designated the particular exercises and the type of apparatus for use in correcting its weaknesses. Each machine or piece of apparatus is numbered according to its place in the gymnasium, and these numbers are also included on the back of the chart, so that carrying out the exercises becomes much easier and more systematic.

Several methods of maintaining these charts have been used, but the one finally accepted and in use now is that of running the strength points down in its column, then checking these against the column of points required in each case, and finally noting the deficiencies in the column alongside the first. This shows at a glance how the man stands; and as the deficiencies are worked off the results are designated in succeeding columns. For example, E. W. A.'s chart shows nine defects—right and left grip, right and left Latissimus dorsi, right and left foot flexor, right and left thigh flexor, and right leg extensor—taken in the early part of September. After a course of corrective exercises he came back in October of the same year and upon being reexamined in these deficient groups he attained the required standard. Another method may be represented by that of R. R. A., who was given the "Strength test" upon entering in the summer, and showed more than 50 per cent deficiencies—allowance being made of 3 inches for the fourth class. For this method of checkage the chart is lined out in somewhat the same manner as a fever chart. His initial test shows his unit curve largely below the standard line for his height. In October after returning to the academy from the summer practice cruise, his next test was taken and showed his deficiency curve less than 30 per cent below normal—

in other words shows a net improvement of approximately 30 per cent. His third test given in October of the following year shows less than 5 per cent deficiencies, or practically normal. In a very short additional time his chart is brought up to the standard.

There are numerous instances of this kind, some taking longer and some shorter periods of time to be brought to or above normal; but all pointing to the same consequence, i. e., all midshipmen with inferior muscular development or weakness have shown decided improvement after taking the prescribed treatment in the form of corrective exercise and physical training; and practically all cases have been able to bring their deficiencies to normal. Of course it is not meant to infer that this is the final criterion of the midshipmen's physical qualifications, but it is of sufficient importance for the one in question to be held responsible for its finality. The starts furnish the desired and very important information as to the condition of the body as far as muscular strength and development is concerned, and furnishes an index of his condition throughout his stay at the Naval Academy and also as to the efficiency of the system used for his benefit.

Every educational institution recognizes the importance of having as large a list of athletic sports as possible for the benefit of its men, and every measure is taken for the promotion of their welfare along these lines. In the military school compulsory drills and formations are necessary, together with a certain amount of gymnasium and Swedish exercises. All institutions—the military more especially—have come to realize the advantage of having medical supervision in the realm of athletics. Men are examined here before going into contests, and are checked up at various times, in order to avoid dangers and prevent detrimental conditions. No better example of the necessity of this can be cited than that of a midshipman on the wrestling team at this institution, who took part in a meet not long ago. This young man was wrestling at a certain weight, and was extremely desirous of training down to a weight considerably lower. To do this it would be necessary for him to reduce his weight 15 pounds within the space of 10 days. This he did by the process of weight reduction known to wrestlers and boxers. The outcome of his bout however, was disastrous. He not only failed miserably to handle his opponent, but at the end of the bout he had to be assisted from the mat in an exhausted condition, from which he recovered slowly requiring careful nursing for several days.

This subject of overtraining can not be emphasized too much. Suffice it to say that the man who overtrains takes his life in his hands. In college athletics there should be no effort made to train down more than 5 or 6 pounds with the idea of keeping the weight

THE CHAPEL, U. S. NAVAL ACADEMY, ANNAPOLIS, MD.

244—1

GROUNDS OF U. S. NAVAL ACADEMY, ANNAPOLIS, MD.

244—2

INSTRUCTION IN WRESTLING AT ANNAPOLIS, MD.

244—3

BOXING CLASS AT ANNAPOLIS, MD.

POLE VAULTING AT ANNAPOLIS, MD.

244—5

IN ACTION AT ANNAPOLIS, MD.

own. Even this should be done gradually, allowing plenty of time or accommodation of the various organs and parts of the body.)f course there are times when athletes lose considerable weight, specially at the beginning of a season—notably football. This, owever, is quickly regained, and the recovery serves as a gauge of is reactions. Many a bout has been lost to a professional boxer who has had to train down considerably in order to enter the ring t a specified weight. The result is a weakened condition. That eing true, why should a much less experienced man risk his match nd his life trying to reach a lower weight? There is no hesitancy in aying that in the future at this institution measures will be taken o prevent midshipmen from "boiling down" their weight more than certain amount. Overzealous trainers will be prohibited from arrying out this method of reduction.

Not long ago the president of one of the largest and foremost uni- ersities of this country asked how many men were engaged in ath- etics at this institution. Upon being informed that approximately ,800 men participated in the various forms of sports last year, he as amazed, and expressed the earnest wish that as many of his own tudents could be interested in that way. During the past year about ,800 of the 2,000 enrolled at the Naval Academy took part in either uthorized or class games. The following is a list of the more im- ortant sports indulged in:

Football.	Boxing.	Water polo.
Baseball.	Wrestling.	Lacrosse.
Basket ball.	Gymnasium.	Soccer.
Track.	Fencing.	Crew racing.
Tennis.	Swimming.	

All of these with the exception of soccer are represented by a arsity team, and all with the exception of crew racing and fencing re contested by classes in addition. During the colder months when he indoor contests are at their height, the sport card is so full that t would be impossible for one to see all the events. Imagine such a ondition as this: A basket-ball game in one building, immediately ollowed by boxing, wrestling and gymnasium contests in another— ll of the last three named being contested at the same time. Simul- aneously, fencing and swimming contests are being carried on in till other parts of the same building. In the realm of spring sports frequently happens that lacrosse and baseball games are being held n one athletic field, a track meet on another, crew races on the water, nd tennis matches on the courts.

It is agreed that physical culture in some form or other is neces- ry for the development of young people, making them stronger, ealthier, and better morally. It is also conceded that these athletic

contests develop a spirit of aggressiveness, self-reliance, courage, and endurance, and cultivate a spirit of sportsmanship and ability to sustain hard knocks. There does not seem to be any reasonable doubt that men who have had athletic training in younger days would be the last to show the white feather in action. The spirit of do or die cultivated in athletic contests is of inestimable value as an asset for the men of our Navy. These would be the last to admit defeat, and would be the first in the face of disaster and hardship, pain and fatigue, to make a new and greater effort.

Some attention must be paid to the fact that many athletes suffer in later life for the strains they have put upon their systems while in the course of athletic training in their younger days. There is many a sad figure seen walking into the doctor's office presenting the picture of one who has "gone bad" after leading a record-breaking career in college athletics. If the history is gone into carefully, it will be found that the majority of these cases are those who have led a very active athletic career while in school, and after leaving there have settled down into business life, making no effort to gradually change from a strenuous athletic existence to a quieter sedentary life. Consequently the hypertrophied heart becomes flabby, valves relax, leaks occur, and a lack of accommodation manifests itself in an improperly supported circulation, giving us the above picture. This, however, has not proved the case with men who have gone out from the Naval Academy.

There are examples without number of officers of to-day's Navy, who have graduated from the academy in years gone by, who are in as good physical condition as could be expected for their age and service. The secret of this lies in the fact that the Government requires that its officers and men keep physically fit at all times; and when they enter active service they do not settle down to a soft sedentary existence, but undertake exercise regularly for the upkeep of their physical condition. As a check upon this, every officer is given a thorough physical examination once a year. During the year preceding this examination he is required to take daily exercise of at least one-half hour. Defects, then, would under this system be certain to crop out, and weaknesses would appear if present. All midshipmen are given an annual physical examination, and those who fail to come up to the required standards are recommended for rejection. In support of the above statements, a careful anthropometric study of officers of the Navy Post-Graduate School who had varying amounts of service, was made by Lieut. S. B. Solhaug, Medical Corps United States Navy. These officers he divided into two groups—first those who were recent graduates of the academy, and, second, those who had five years active duty. The second group showed a greater percentage of deficiencies than the first, particularly in the dorsal

abdominal, and femoral groups of muscles. This furnishes convincing proof of the necessity of requiring officers and men to keep up their physical condition.

As to the harmful effects of athletics there is very little to be said. These are partly avoidable through the aid of medical supervision, and have been brought down to a minimum at this institution. These conditions arise from excessive strain upon the heart and other organs, and may be avoided by eliminating the unfit, proper diet, training and exercise, and avoidance of overtraining. Sometimes unforeseen conditions result from indulging in violent exercise too soon after eating. With proper warning and training these may be eliminated entirely. The accidents that occur during contests and due directly to them, are almost entirely unavoidable, but can be minimized by the immediate removal of the contestant and application of proper treatment. No one should be allowed to remain in training too long, as a prolonged and vigorous course of training will produce injurious results. After a period of about four months the young athlete should be advised to break training for a time. It is a well known fact that even within this space of time the athlete may go "stale," and have to be removed from the training table until a sufficient improvement is brought about.

The injuries growing out of these athletic contests have been derived chiefly from football, lacrosse, and wrestling. They consist mostly of sprains, dislocations, fractures, lacerations and contusions—in order of frequency. During all contests at this institution, a doctor is to be found at the scene of activity with a kit for first-aid treatments, after which the injured are either sent to sick quarters or to the naval hospital, according to the severity of the case. Boxing and track contribute their quota of injuries, but no extremely serious accidents have occurred in the experience of the writer with the exception of one fatality resulting a few days after a boxing bout, due to secondary cerebral hemorrhage.

The gymnasium medical officer has adjoining his office a treatment room, called "Misery Hall," where there are numerous devices for baking, massage, and the application of heat, facilities for dressings, strappings, and splints, and a high-frequency machine with its modalities. The latter has been used with very gratifying results in the treatment of the contused muscles, especially those due to football. It has been found that these conditions yield more readily to the treatment by the D'Arsonval and Sinusoidal currents, combined with the preliminary symptomatic treatment in the beginning, than from any other.

As stated before, there is a regular routine of compulsory exercises carried out, and each midshipman is required to qualify for each of the tests in each group as they are arranged. When he fails to

qualify a red check is placed in the proper column against him, and carried there until he has made the grade. The entering class is given one hour of Swedish drill a day during the summer, and each member is taught to lead and command. During the academic year each battalion of the fourth class is given a week of gymnasium drill—consisting of five one-hour periods—every month; and 20 minutes of each of these periods are devoted to Swedish exercises. The third class is divided into two sections, each of which has one hour of gymnasium drill a week, 20 minutes of which is Swedish. Men out of any class who fail to qualify in any of the tests relative to these drills and exercises, as well as those who are deficient in the Dynamometer tests, are placed in a special gymnasium squad, and given one hour of Swedish movements each week in addition. Whenever it is found that a midshipman of the first or graduating class has failed to make the average for as many as five muscle groups, he is considered as not qualified physically.

There are a number of gymnasium tests which each midshipman is required to pass before he is considered up to the standard. These tests are graded as C, B, and A—the C test being required of all fourth classmen, B of all third classmen, and A of all second classmen. These number 14 in all, and run as follows:

(1) Bar vault, height of shoulders, double take-off without run.

(2) Standing broad jump, distance according to grade.

(3) Running high jump, height according to grade.

(4) Dips on parallel bars, number of times according to grade, without a swing.

(5) Chins on horizontal bars, number of times according to grade, using any grip.

(6) Rope climbing, climbing hand over hand.

(7) Making fast on single rope, for all classes.

(8) Short horse exercises, strides and vaults according to grades.

(9) Throwing medicine ball, distances graded, right and left hand.

(10) Mounting shelf without assistance, using any method.

(11) Running 440 yards, outdoor and indoor.

(12) Horizontal-bar exercises.

(13) Wall-bar exercises.

(14) Tumbling, forward and backward rolls, and cartwheels.

Each midshipman is required to know how to swim, and all must pass certain tests in this division. The first test is that of keeping above water for five minutes, demonstrating breast, side, and back strokes. The next is that of swimming 120 yards in 3 minutes and 30 seconds, using the breast, side, and back strokes, each for 40 yards. Included in this test is diving into the water and raising

n object from the bottom of the pool. The last test is that of wimming 160 yards in 4 minutes and 30 seconds, using the breast. de, back, and either the Trudgeon or Crawl strokes, each for 40 ards. Included in this test is approaching a drowning person and wimming with him 20 yards to a place of safety, and then demonrating ability to properly apply methods of resuscitating the pparently drowned.

Besides these physical requirements there are tests in wrestling, oxing, and sports in general. There are other tests given in comand and leadership, small sword, saber, and cane, and setting up xercises. Last but by no means least, comes the question of posture. r "brace." Posture is one of the most important considerations for ny military man, and is a subject that is gone into very thoroughly. treatise has been prepared and incorporated into booklet form for ne use and instruction of midshipmen, and each must have this in is possession. It contains in condensed form the theory and prace of posture, both at attention and marching; and at the end there a chart of errors showing the more common faults of posture and ow they may be obviated. Also the booklet contains a compact st of setting-up exercises, which may be easily made use of as a aily routine.

As an integral part of the midshipman's course of instruction hould be mentioned the course in hygiene. As enacted by law the raduating class receives 14 lectures during a term besides periods f extra and individual instruction in the gymnasium. This course ncludes personal and general hygiene, anatomy and physiology, reventable diseases—especially venereal, and the effects of alcohol nd other narcotics. This class is examined at the end of the term nd held accountable for a passing mark. Regular lectures on ersonal and general hygiene, including venereal and other preentable diseases, are given to the entering class. Thus we see that o midshipman goes out of the academy without a knowledge of hysiology and hygiene, and the dangers of venereal diseases. The ourse in hygiene is enhanced by the use of lantern slides and oving pictures. The lectures are illustrated as far as possible. or two years a special exhibit on social hygiene, under the auspices f the Sixth Division of the Bureau of Navigation, has been held for e benefit of all midshipmen, as well as for the entire personnel.

For handling the sick, a dispensary service and sick quarters are aintained in the main dormitory building of the midshipmen. This epartment consists of a large and well stocked dispensary, consultg room, dressing rooms, laboratory, sterilizing plant, dental offices, nd a complete eye, ear, nose and throat outfit, including a dark oom. A corps of doctors, dentists, an eye specialist, and a number

of hospital corps men are on duty there. Ample quarters for bed patients are maintained in sick quarters adjoining the dispensary and on the sunny side of the building. These wards consist of from four to ten beds each. The minor diseases are treated here, while the more serious and prolonged ones are transferred to the naval hospital at Annapolis. As an example of the work done by the medical department, the statistics shown in Table I indicate the work of the past three years.

TABLE I.—*Tabulation showing three years medical service.*

	1918	1919	1920
Number of admissions, all cases	4,134	2,384	2,568
Number of readmissions, all cases	228	142	141
Admissions and readmissions for diseases	4,155	2,220	2,284
Admissions and readmissions for injuries	207	306	232
Total sick days	8,153	3,369	5,495
Total sick days for diseases	7,800	2,844	5,110
Total sick days for injuries	353	525	385
Average number of admissions per day	22.3	9.5	7.09
Average number of admissions for diseases	21.4	8.06	6.29
Average number of admissions for injuries	0.9	1.44	0.8
Percentage of sick	0.7	0.35	0.66
Average complement	3,110.2	2,660.6	2,290.6
Number of cases transferred to hospital	2,912	1,631	1,220
Number transferred for injuries	135	190	145
Disease causing greatest damage, influenza:			Bronchitis
Sick days	4,076	303	576
Number of admissions and readmissions	1,984	167	339
Gastrointestinal diseases, midshipmen only:			
Admissions and readmissions	202	38	117
Number of sick days	209	54	176
Football, midshipmen only:			
Admissions and readmissions	15	75	78
Number of sick days	41	151	163
Number of visits of midshipmen to sick quarters	50,244	24,037	31,240
Damage in sick days	5,714	1,908	3,780
Damage in excused days	17,112	4,606	6,894
Average number of visits per day	137.6	65.8	85.3
Average number of midshipmen	1,772	2,008	2,058
Number of men invalided from service	54	32	12
Number of men died	2	3	5
Number of vaccinations	1,421	720	1,115
Number of anti typhoid inoculations	1,694	745	1,065
Number of urine examinations	213	3,546	4,395
Number of blood examinations	2	2	61
Number of feces examinations	9	152	158
Number of smears examined	28	10	61
Number of sputum examinations	15	45	189
Number of milk examinations	3		32
Annual physical examinations—midshipmen	1,461	2,108	1,840
Annual physical examinations—candidates	1,035	774	608
Preliminary examinations—candidates	174	63	55
Myopia cases	44	58	187
Hypermetropia cases	85	69	95
Astigmatism cases	102	56	34
Other causes	21	5	3
Dental patients treated		2,218	1,770
Dental treatments given		3,724	5,450

SOME ELEMENTS OF LEADERSHIP.[1]

By E. L. Munson, Colonel, Medical Corps, United States Army.

PART I.

Personality and leadership.—Leadership in itself is a subject, which, if discussed at length and in its entirety, would fill a volume. t has its importance to civil industry quite as much as to the military service. Everything contained in this book bears directly or indirectly on the subject, for the scientific handling of men implies the ssential qualities of good leadership. True leadership elicits cheerful and willing obedience and coöperation from subordinates and is he antithesis of "Prussian militarism." Under it, men perform cts because of a desire to do so, not merely because it is their duty r the order of higher authority.

Leadership is the creative and directive force of morale; the two re inseparable. This vital relationship might be likened to the losed electric circuit, morale being the current—the powerful elecromotive force—and leadership the conductor which guides and ransmits it to the motor. Either one without the other is of no reat practical value. Morale without leadership is like the unconected dynamo, while leadership without morale is but a dead or rossed wire. The ideal and effective organization is the one which mbodies both factors.

Leadership has gained recognition and prominence in the military orld far greater than the mere tactical and technical manipulation f troops in the field. The success of an Army in peace or war, or he functioning of a great industrial establishment, depends very rgely on the human-leadership ability of its superiors. The mere olding of a commission does not make an officer a leader. It asumes that he is a leader, but it is further necessary for him to prove hat he is one. The responsibility of leadership includes not only the fficer but extends through him and beyond him to his men.

Personality is a powerful factor in leadership, for the success or ailure of a commander indicates the worth of his personal qualities s a leader. Military organizations, like businesses in civil life, reect, in their work or operations and the results they obtain, the peronalities of those who create or operate them. There is no person f experience who has not seen the degree of morale and efficiency an organization fluctuate for good or ill with change of administrators and the influence of their diverse qualities of personality.

The morale qualities of both officers and men, the spirit and way which they do things, are cardinal elements in all military enter-

[1] Reprinted from "The Management of Men," by permission of Henry Holt and Company, New York City, and the author, Edward L. Munson, Colonel, General Staff (Medical Corps); Chief, Morale Branch, War Plans Division (lately Brigadier General, General Staff).

prise. Men and the human element, not material, are the determining factors in war. In any military force its component organizations are equally well equipped and any differences in military efficiency is represented by qualitative difference in personnel. One not only "knows how," but "does" things better than the other.

History is full of instances where some leader of men turned defeat into splendid victory because he refused to acknowledge that he had come to the end of his strength and resources and because he imbued his men with the same idea. Similarly, imminent business failure has been turned by some great "captain of industry" into business success. No man is beaten until he thinks he is; no army is conquered until it accepts the idea of defeat to such an extent that its acts transmute ideas into facts.

Thus a study of the personality of great commanders in relation to leadership would be very valuable, for it is personality which enables one man to succeed where another fails. Unfortunately, military history is faulty in such matters, giving little information on the personal equation and dealing with results rather than the attributes of the leaders who brought them about. Similarly, where failure has occurred history tends to let the commander and his personality pass as rapidly as possible into oblivion.

The personality of superiors is a most important factor in its reaction on mental state brought about by physical conditions or environment. In many instances the agent is more important in this respect than the system represented. The fact that the individual frequently typifies a condition is too often disregarded. Thus the child kept after school for failure to know its lessons nurses far more resentment against the teacher who enforces this requirement as a means of bringing out education than it does against the educational system itself. The latter is submerged by the personality of the teacher, against whom the resentment of the child may be manifested by epithets, caricature, or disorder.

So, too, the officer or sergeant brought into close directing contact with the soldier, and especially the recruit, embodies the military service in his mind. The concept of army life is largely based on the personality of those who are most immediately related to the carrying out of its requirements. The soldier who deserts is very frequently led astray under the idea that the requirements of the service are intolerable, when in reality it is the personal characteristics and methods of one or two military agencies that are offensive to the point of being insufferable. The same applies equally in industry.

Personality in the officer is expressed by appearance, voice, dress, bearing, expression, intonation, and gesture. Every one of these

ctors should be considered in relation to its effect upon the soldier. or the leadership which morale work promotes is personal, not echanical. The esteem in which a commander is held by his other officers is known to the men and gives proportionate prestige o him in their eyes. Success breeds confidence and thereby draws nd stimulates support. Few successful officers have any appearnce of haste or worry. Their machinery is too well organized nd their perspective and sense of proportion are correct. They o not consider that leadership ends in giving proper orders, but ather in so inspiring the men that they make a voluntary contriution toward the required purpose beyond the essentials of duty.

The officer who has to fall back on rank, authority, and punishent for the accomplishment of his purposes is a driver of the unilling and not a leader of men. Only the officer who has the power f evoking voluntary cooperation to the utmost limits can be conidered a real leader.

There are two ways of handling men. One has as its object the eterment of undesirable act by repression through the use of force, ear and punishment. It is the most direct way, and to many officers is the shortest and easiest. It is the refuge of the superior who is ithout full confidence in self-ability to lead. It is vastly more poent in keeping men from engaging in undesirable acts than in stimlating to good ones. By it some of the more conspicuously undeirable qualities in some men are crushed out. The refractory ones ll the guardhouse or desert. Those who are left tend to be fair oldiers of more or less colorless character.

The other method is more difficult to employ and takes a thorughly interested and able officer to carry it out. It calls for tact, atience, and understanding of the psychological factors involved, nd a capacity to meet men on a plane of intellectual honesty and uality, without patronizing, bullying, or seeking popularity. It eeps the guardhouse clear, the absentees few, and controls conduct y incentive and stimulation rather than repression. It arouses and evelops the best there is in a man.

Efficient leadership is based on knowledge of the human mind and l morale factors. In peace, the tendency is to overlook this point; war, it dominates all other considerations. The power to inspire, a reinforcement of proposed act, is well recognized. History ounds in stirring examples of the ability of great leaders to inspire d sway the soul of their Armies to the achievement of victory. lexander, Hannibal, Caesar, Mohammed, Cromwell, and Napoleon l possessed this ability and used it to definite purpose. The arousig of faith and conviction is one of the essentials of leadership. aith, as the Scriptures say, will move mountains. To inspire faith to give ability to accomplish.

The difference in the efficiency of officers in handling men has long been recognized. It varies from the high degree of success of those who are born leaders to those who, despite their best intentions, are followed through their Army career by a wake of disorder and desertion. The secrets of the success of the one and the faults resulting in the failure of the other have never been properly studied, classified and made of general knowledge. One function of morale work is to bring this about, so that the methods of the successful may be given to others for the benefit of the service as a whole and not be allowed to lapse with the retirement or death of the officer originating and practicing them.

As necessary to the accomplishment of this, morale work contemplates inquiry into the methods of handling men which appear to be good, the determination of relative values, the formulation of general methods of procedure with an exposition of the principles of which they are an expression, and the placing of the entire matter before the Army as a whole. This will enable the officer lacking in administrative knowledge to educate and inform himself and correct his faults. It will enable those who are willing to learn and adapt themselves to higher standards to do as well as the best, and the best, by pooling their information and methods, to do still better.

In all matters of administration in relation to morale, supervision and advice from higher authority is valuable. It is true that a certain few individuals, left to themselves, will handle morale matters reasonably well merely because they possess a personal ability and tact in the management of soldiers. It is also true that the experience of each and any of these officers, quite irrespective of their interest and willingness, will never be as broad as that of the total group of which they are a minor part, and that if left to themselves, their efforts must fall short of what they would accomplish if given the benefit of a central clearing house of information where the best ideas and methods of all are turned in for use to the mutual advantage.

There is another class which possesses no special natural abilities in the management of men, and in whom such qualities, in the past have been wholly the development of experience. But practical experience of this sort, valuable though it is, must inevitably result in a line of conduct based quite as much upon recognition of the mistakes committed as of the successes achieved. Most such officers are careful to avoid any sources of error which other officers have found to exist, and to govern their conduct accordingly. Morale work points out the practical difficulties which others have encountered in a way that they may be avoided. This group represents by far the largest proportion of officers and one which welcomes such

gestions looking to the betterment of their administration, weighs them intelligently, and applies such as appear of probable advantage to the extent and in the way apparently best suited to the meeting of their local problems.

Another group is one naturally deficient in judgment, tact, discretion, common sense, sympathy, and other essential qualities in one or more respects. These qualities can to some extent be cultivated, but in many cases they will not be except through pressure from outside exerted through their military superiors. The morale organization is intended to furnish superiors with an efficient agency by which they may more readily determine and remedy such shortcomings.

There is a fourth group, fortunately small, which is the antithesis of the first group mentioned. Its members are, for one reason or another, more or less temperamentally unfitted to command men. Some of these cases are unquestionably due to unsound mentality manifesting itself in arrogant, tyrannical, harsh, capricious, nagging, or suspicious conduct. Not a few such superiors ultimately find their way via medical reports to institutions for the care of the insane. The morale organization can do nothing for this minor class other than to call attention to their mental instability and vagaries of conduct earlier than would otherwise be the case and thereby more promptly relieve the service of the burdens which they impose.

Where morale is depreciated by bad management and leadership, the superior at fault is usually quite unconscious of his part in the results. He is wholly honest in his desire to get proper results, and honest in his belief that the methods he adopted were the ones most suitable and proper. To show such error and demonstrate better methods without arousing undue resentment necessarily requires the utmost tact.

Manner.—Manner is one of the qualities of behavior. It is usually a good index of the state of mind, even though it belie words. As such, it has an important influence on the mental state of others. Frequently it is not so much the act itself that matters as the manner in which it is done, which may denote intent. An intent is important in its effect on others, whether in word or deed. The injury which was obviously unintended is excused; the calculated slight, even if trivial, is resented. In Owen Wister's novel, The Virginian, when the villain uses a "fighting name" the hero says: "When you call me that name, stranger, smile!" The importance of manner is expressed in the jingle:

> It isn't the thing we do or say,
> But all in the way we do or say it:
> What would the egg amount to, pray,
> If the hen got up on the perch to lay it?

The manner of superiors is carefully watched by their subordinates. What is going on in the minds of officers may often be understood without a word being spoken, just as the moving-picture actor registers emotion without the aid of words. The cultivation by officers of a calm, dispassionate manner, under such control as to be unswayed by undesirable emotions, is clearly essential. They must possess self-mastery over facial expressions, intonation, and gesture. If an officer's stout words come from an apprehensive mind, he will not easily conceal the fact; some expression or act will be apt to disclose their emptiness and thereby belie their intent. Similarly, a benefit conferred in an obvious spirit of condescension fails in the results desired through the feeling of resentment and opposition aroused by manner. Austerity of manner closes the door to reciprocal sympathy and confidence. Overemphasis may defeat its own ends. In war or business relations, manner of superiors toward subordinates makes for or against sympathetic relations and co-operation.

Not only the thing to do but the manner of doing it may be conveyed by suggestion. The snap and vigor with which a command is given carry with it the implication of similar qualities in its execution. Human beings are imitative, and soldiers tend to adopt the outward expressions of those whom they look upon with respect. Gestures are suggestive in that they carry shades of meaning which can not be fully interpreted in words. They are used not only for direction but for emphasis. They are violent and uncontrolled according as the individual is carried away by his emotions, as in panic.

Language.—Language is the chief agency for the direct transmission of ideas and the control of purpose. It is one of the components of manner, and its nature and form of expression give much information of the mental state or attitude behind it. The language of the individual is one of the qualities by which he is judged, particularly by his subordinates, and to some extent by his superiors. It should always be clear and to the point, yet modified by self-restraint.

Words should be well chosen for the thought or purpose to be expressed, should be short, and preferably of English derivation. Sentences should also be short, clear, incisive, and uninvolved, so that there may be no mistaking their meaning. Statements should be positive and direct, rather than negative, uncertain, and inconclusive. Such language as "you may be able to do it," "see if you can do it," "I doubt if you can do it—but try," should be avoided in giving instructions. It is far more effective and productive of results to say "you can do it," "you are just the man to do it," "there must be a way—find it." One produces uncertainty, doubt, and wavering; the other incites confidence, self-reliance, and determination.

Officers would do well to consider the phraseology of their orders, both verbal and written. Although the purpose of the order or the instructions it is intended to convey are perfectly clear to the officer himself, it frequently happens that the language of the order is capable of quite different interpretation or construction. Before criticizing men blindly for failing to comply with orders, it might be well to look into the character of the instructions they have received. When these are taken into consideration it will perhaps appear that subordinates may honestly have understood the purpose quite differently than was intended. The mentality of the persons for whom orders are intended should also be taken into consideration in formulating them.

Simplicity of language is the keynote of success in issuing orders that are effective and universally understood. The language used in the orders of famous military leaders, particularly before or after battle, is noteworthy for its simplicity, purity, forcefulness and inspirational beauty and power. Innumerable examples of these are accessible to any one caring to study them. Exaggerations and extremes should be avoided, not only as unfair but as revealing a perturbed or prejudiced state of mind.

As elsewhere brought out, the energy pent up by the many restrictions of military life tends to find outlet through immoderate language, cursing and profanity, especially on the part of enlisted men whose instinctive tendencies are particularly repressed by their environment. This tendency was long recognized in the Articles of War, which endeavored to repress it by putting a penalty on the use of profane language by officers and men, probably not only for ethical reasons but for its effect on possible human objects. If such language is used in the handling of men the results are unfortunate. To curse a man in civil life is ordinarily to affront him through recognition of intent to insult. Occasionally such intent may be modified or shown to be absent by manner. Also there are men in whom the habit of profanity is so deeply seated and carried out so habitually as to be ultimately recognized as unconscious or impersonal. Such, however, are exceptions.

Unquestionably, one great cause of discontent and animosity, and one of the factors in desertion, has arisen from the swearing at men in the ranks by their superiors. In replies to a questionnaire by a large number of enlisted men this matter was reported as one of their experiences in the military service which they bitterly resented. The individual subjected to it feels affronted and humiliated, and that his self respect has been impaired in the eyes of his comrades if he makes no retaliation. As the latter is impossible in the military service either by word or act, he feels that the offending superior has taken

an unfair advantage of military status and authority. As an insult, he may brood over it in secret or with his friends. If quick tempered, he may resent it by disobedience of orders, assault, or other act of indiscipline. In any case it will produce animosity, sullenness and a passive opposition or lack of zeal which results in inefficency. A too common result is a state of mind in which the condition seems not only irremediable but intolerable, and absence without leave or desertion may seem the only means of relief from the situation.

Similarly, the so-called "bawling out" of men will always be resented as something personal and not warranted by higher authority. Too frequently it is not so much corrective as an expression of anger on the part of the superior. Here the impersonal point at issue is lost and the matter becomes one of mental clash between individuals.

All but a few officers avoid the foregoing faults. Many more non-commissioned officers are offenders. This is especially the case with regard to recruits, with whom such language is used, under the mistaken idea that it promotes and emphasizes military authority. Drill masters and others handling recruits should be especially watched to see that they are not transgressors in this respect. If violent language ever has any basis for use, it should be reserved for the extreme emergency, as in rallying a breaking line or stopping a fugitive. A tongue lashing of this sort, like the use of the whip on the draft horse, has a stimulating and steadying effect which is lost if it be habitual.

Undue or habitual sarcasm may produce an effect similar to cursing, but to a lesser extent. The wittiness of sarcasm tends to take off the sting of the reproof, while leaving the lesson. Sarcasm is not necessarily an insult and hence is not objectionable on that account. The manner in which the sarcasm is rendered denotes the quality of intent. But it is an edged tool, unquestionably useful within certain limitations and with certain individuals, but as a whole to be employed with care and never with an apparent purpose of causing personal humiliation. It should be used as a stimulant rather than a repressant.

Tact.—Tact is the adaptation of method, manner, time, and suggestion to the individual group personality of those who are to be acted upon, so that the best results may be secured. It implies mental perception, whereby ability is secured to deal with others, not only without giving offense, but with the least friction.

Tact may put men whole-heartedly behind plans which they had not previously looked upon with favor, smooth out difficult relationships, and harmonize forces which might otherwise be harmful or antagonistic to morale. Tact implies not only understanding of human nature but knowledge of how to put this insight to use. It

means not only knowledge of when and how to do things but of when and how not to do them. It implies a diplomacy which leaves even prejudice disarmed.

Tact is one of the greatest assets of the good leader. Like good judgment, it is to a certain extent an endowment. But it can be taught and is susceptible of very great development in most cases. It tends to be acquired more or less unconsciously and as a by-product resulting from human relationships.

Lack of tact is always resented, even though the absence of hurtful motive in the pain-producing act be admitted. The tactless superior alienates the sympathy of his men, substituting tolerance, resentment, or opposition. He is soon aware of this through act or by sensing alteration in their mental attitude. This may in turn be resented as unfair by the officer, who feels himself to have been governed in his acts by his best sense of justice. The result is further clash of wills and undesirable effect upon behavior and efficiency. The original proposition may be largely lost sight of through the new personal element which is injected. Every officer will recall to himself individuals and instances in which tactless methods have produced results the opposite of those desired, or where the exercise of tact has been a constant factor for good or has dissipated situations which bid fair to be very serious.

Cheerfulness.—Cheerfulness is one of the great objects of morale work. It is part of the mental machinery necessary to getting desired results. It is an essential to high efficiency, for when men are cheerful they respond willingly to any call and give the best effort that is in them. The factors promoting cheerfulness are so many that they will not be entered into in detail here. Suffice it to say that this book as a whole is devoted to methods and measures for its development and maintenance.

Closely allied to the quality of cheerfulness is that of optimism. There is always a brighter side of things and the successful commander will look for and emphasize it. Those who look unduly on the dark side sow gloom, distrust, doubt, and despair, and create a mental state which tends to make apprehensions come true. Conversely, the optimist sees the possibilities which make for success and incite to effort.

Besides cheerfulness and optimism there is another essential factor of a similar nature which makes largely for success—enthusiasm. Cheerfulness is the only entrance into the realm of enthusiasm and is as potent a factor in an Army as grimness or grit. Enthusiasm comes from the Greek and in the original means "God striving within us." It transforms work into play, hardships into part of the game, and failure into success. It is the difference between doing things

perfunctorily because it is duty and doing them with vim and vigor because of a desire and gladness to do them. It underlies esprit de corps and means not only an appreciation of conditions from their better aspect, but unceasing effort for their further improvement. Enthusiasm for a task on hand ensures its successful completion. It is an old adage which says, "Where there's a will there's a way."

It might be well in this connection to caution about overenthusiasm. Enthusiasm can not be too great in carrying a matter through, despite all obstacles. But overenthusiasm is sometimes disastrous, in that it may blind to vital miscalculations. In Benjamin Franklin's philosophy occurs the maxim, "Be sure you are right—then go ahead." Perhaps it would be better to amend this by adding, "and while you are going ahead, be sure that you continue to be right."

Courtesy.—Courtesy is the lubricant of human relations. Army Regulations recognize this fact when they say, "Courtesy among military men is indispensable to discipline." It will be noted that the above quotation establishes no limits as to rank or status, but applies alike and reciprocally to all in the service.

By courtesy is understood politeness, originating in kindliness and good breeding. It is a civility in which a superior can not afford to be outdone by a subordinate. It is often expressed quite as much by act and manner as by words.

The official expression of military courtesy is the salute. This is the sign of courteous recognition between officers and men of membership in the same blood brotherhood and is not to be construed and enforced as evidence of the inferiority of individuals. The popular criticism of it is chiefly due to the erroneous assumption that the latter is the fact—an assumption which the attitude of inexperienced officers sometimes tends to justify

The salute is rendered, not to the person of the individual superior, but through him to the high command, the State, and the authority which he represents and which is vested in him by virtue of his commission. In its true conception it is no relic of feudalism nor vassaldom, as is often held by those in ignorance. The same salute is prescribed for the general as for the private, and it is just as incumbent upon the general to return it in a soldierly manner as it is upon the private to render it in a soldierly manner. There is no distinction whatever in the manner of saluting. All officers will do well to keep this constantly in mind.

The superior may safely count on being rendered the salute in much the same manner as it is his custom to return it. Too many officers are indifferent or listless in this respect. It is just as essential for officers to return the salute, when standing still, from the position of attention as it for soldiers to render it from the position of attention under the same conditions. Officers and men alike are

often judged by the quality of their salutes. At one camp, during the war, the commander ordered all new officers to attend a courtesy school to remedy their faults along these lines.

Similar to the salute rendered to the superior officer is the salute rendered to the flag, which is an expression of support to the country and the ideals which the flag itself typifies. It is not rendered to a yard of bunting, but to the sacred standard of the Nation and the traditions which it symbolizes. Presentation of arms is symbolic of offering up self and weapon.

The rendering of the salute is one of the best expressions of military morale or cohesiveness. At the beginning of the Bolshevik rule in Russia, the Soviet Congress passed a resolution as follows: "The men in the future will not salute officers." Of this Col. Applin wrote: "Now, isn't that a trifle? Yet this small trifle has led to the telegram that reads, 'The troops have left the trenches; the artillery is being sold; officers are serving as cooks and orderlies.'"

Justice.—Justice is not considered here in connection with penology only. It means the rendering to every one of his just dues, whether these are rights, rewards, or punishment. It is the expression of the "square deal," which gives the man "what is coming to him."

The success of any officer largely depends on the justice which he accords his subordinates. His powers are great and it is therefore essential that they be exercised with evenness and fairness. Men work well in an atmosphere of impartiality, regardless of the amount of work which they are required to do. If an idea gains ground that favoritism or prejudice exist, contentment is destroyed. This may be in the matter of advancement and opportunity, the assignment of duties other than by roster, or the inequitable award of commendation or punishment. Personalities are beneath the real administrative who, because he is aware of their inevitable influence, takes particular care not to be led astray by them.

In any matter of doubt or conflicting interest, all aspects should receive patient and equal attention. Hasty superiors who make quick judgments often fall into error through basing their conclusions on false or incomplete premises, and so lose the confidence of their men in respect to their qualities of judgment. Decisions must be judicial, yet a sympathetic element should be present. Above all, subordinates must be convinced of a desire to be fair and just. Full credit for success, as well as censure for failure, should fall inevitably where due.

Discipline.—Discipline is a word more or less repellant to American ears. The basis of our Government is the fostering of individualism, and pressure from above is resented unless in pursuance of an obligation, not only accepted but understood. As civil govern-

ment rests on the just consent of the governed, so this same principle, in its essentials, applies to the military service. Thus disobedience and mutiny occur in any army where there is failure to continue to give such consent.

Discipline, under wise command, is enforced by public opinion and formed and directed by those above. It is the result of positive and not negative action, by which is meant that government rests on approval of what is handed down from above, rather than on its enforcement through painful experience and deprivation.

Experience shows that the indiscipline of the individual makes neither for his own happiness nor that of the mass. He is a misfit, out of harmony with the scheme of things and his associates. He impedes team work and coördination for a common object. Through faulty adjustment he interferes with the effective functioning of the military machine as a whole. The soldier soon comes to see this himself, but civilian critics, in their failure to grasp the military scheme, see in discipline only an unnecessary interference with individual purposes and preferences.

It is true that Army discipline is not pleasant. No discipline is pleasant, for human instincts are such that freedom from their control is generally enjoyed. But the unnecessary asperities can be so removed from Army discipline by judicious officers that there will be little left to cause chafing. When an artillery harness is to be worn it can be worn best and most efficiently by the animal when well adjusted.

Careful investigation shows that the dissatisfaction of enlisted men toward the service is not due to the general requirements of discipline so much as to the manner in which such disciplinary requirements are enforced by their superiors. There is no special objection to discipline per se, for its necessity is recognized. Restrictions which appear to be unnecessary to the efficient performance of duty, but which have been imposed under the presumption that they might be aids to discipline, too often have the opposite effect and arouse resentment and indiscipline through the idea that such requirements represent an arbitrary and harsh exercise of power. The martinet antagonizes those upon whose support he must rely.

Discipline is due to two factors, training and morale. One represents the knowledge and ability to fight, the other the will to fight. Training affects the machinery, while morale is the power that makes the machine function. Both factors are indispensable. Discipline is not a state which can be brought about by rule, but by general principles only. In their methods no two successful disciplinarians are alike, even though similarity of results may make them seem so. With common standards, each must try in his own way and with the degree of success which his individuality permits.

Military discipline is popularly understood to be a state which is necessarily created and maintained by force. The general public believes it, and too many superiors practice it. Such discipline of force endeavors to compel adjustment rather than prevent maladjustment, and therein its methods are opposite to those of morale work. It is a poor method of control, for it arouses reaction and opposition. Where discipline is maintained through punishment, rather than through willing cooperation, there tends to arise a state of deception, evasion, and contest of wits between the offender and those charged with the enforcement of orders. American soldiers will not long support a disciplinary system of a wholly repressive sort. If persisted in, resentment and acts of disorder may be expected.

It is true that Prussian discipline rested on force and fear. It was an effective system for Teutons, for it was adapted to their racial psychology. Strongly gregarious and of inferior initiative, it suited them to be crushed into a state of military communism through a machine of their own making. Such a discipline is rigid and inelastic. It provides poorly for emergency, and under adversity, it does not yield resiliently but tends to crumble apart.

A misguided soldier once expressed the idea of discipline as "doing something you don't want to do." Nothing could be more illogical—as if, because soldiers did not want to retreat were proof that they ought to, or, that because they would rather be anywhere else they would demand admission to the guardhouse. The expression, however, is interesting because it shows the popular understanding of discipline, but the word really means something quite different. "Discipline," says the dictionary, "is the treatment suited to a disciple." And "disciple," in turn, it should be emphasized, means "A willing follower." True discipline can not be forced, it must be induced.

Certain results are indispensable to military efficiency. That method is best which brings the best results with the least delay and difficulty. The handling of men by appealing to sentiments of honor, duty, and patriotism, rather than by coercion, will usually prove superior. Human beings are best governed by the application of measures other than those of simple force.

True discipline, accordingly, is the result of volition rather than of fear of punishment. It is due to stimulation rather than repression. Such a discipline exists and functions, not only while men are under the eyes of superiors, but while they are off duty, because they are in a frame of mind heedful of admonition and are anxious to do right. This higher form of discipline is due to the voluntary submission of the individual to a common purpose. Voluntary submission of this kind is based on knowledge, reason and idealism.

It was the discipline of the Allies which, after apparent defeat for four years, still held a thin line—bent, stretched, but unbroken. It is the discipline which the psychology of the American makes best adapted to our Army. If a commander has built up such a state of mind that his organization trusts and supports him, the force of public opinion largely replaces any official compulsion as the agency of discipline. He rules, not through such unlimited and autocratic power as was exercised by the German officer, but by having developed a cheerful and willing obedience, which seeks to respond to need without being driven to it. It is a spirit of mutual helpfulness in which all ranks desire to take a little of the burden off their superiors and are constantly watchful for the opportunity to do it. The organization becomes regarded by its members as a joint-stock concern, in the success of which all, as shareholders, are interested.

Although discipline means submission, it does not mean submission to officers so much as to the system which they apply. In the military machine, certain individuals must dominate their respective groups. If this authority is worn as a personal attribute it is liable to be resented by subordinates, which in turn perhaps results in rebuke or threats of punishment by the superior. Here the main point becomes obscured through contest between self-assertions, and while outward conformance may be enforced, sullenness, animosity, and resentment may result. This brings up the point that while discipline is intended to control men its measures in practice are usually seemingly directed more to the training of the body than the mind. It teaches rather the outward conformance with the military environment than the more important purpose of inward adjustment to its characteristics.

Practically everything in the military service enters as a factor for the promotion or subversion of discipline. Sometimes the effect is direct and obvious; in other influences the effect is subconscious and cumulative. It is essential always, however, that there be a feeling of solidarity and group support in order that there may be good discipline. When, for example, personnel is frequently transferred a feeling of uncertainty and insecurity results that makes for disintegration. On the other hand, the probability of active service is a great aid to discipline. The guard house tends to empty itself almost automatically when troops are ordered for active service; in other words, when the purpose of discipline becomes concrete and imminent instead of abstract and remote. The mental acquiescence resulting from a recognized military necessity alters behavior. (To be continued.)

HISTORICAL.

WITH ANSON TO JUAN FERNANDEZ.

PART II.

By W. M. Kerr, Lieutenant Commander, Medical Corps, United States Navy.

On the 7th of March, 1741, Anson's squadron passed through the Strait of Le Marie between Terra del Fuego and Staten Island with fair weather and a brisk gale. As soon as the vessels had reached the open waters to the south of the strait, the aspect of the sky changed. The wind shifted to the south and blew in violent squalls which necessitated taking in the topsails and reefing the mainsails. Under the influence of the winds and adverse currents, the vessels were driven to the eastward. This tempestuous weather continued day after day with violent gales and heavy seas which filled the crews with fear, "for the oldest and most experienced mariners on board had never before encountered such mountainous waves" which threatened every moment to engulf the vessels. The *Centurion*, Anson's flagship, was constantly rolling and pitching with such rapid and violent motions that the crew were "in perpetual danger of being dashed to pieces against the decks or sides of the ship." Chaplain Walter of the *Centurion* in describing the events of these days says: "And though we were extremely careful to secure ourselves from these shocks, by grasping some fixed body, yet many of our people were forced from their hold; some of whom were killed, and others greatly injured; in particular, one of our best seamen was canted overboard and drowned, another dislocated his neck, a third was thrown into the mainhold and broke his thigh and one of our boatswain's mates broke his collarbone twice, not to mention many other accidents of the same kind. These tempests, so dreadful in themselves, though unattended by any other unfavorable circumstance, were yet rendered more mischievous to us by their inequality, and the deceitful intervals which they at sometimes afforded; for though we were oftentimes obliged to lie to for days together under a reefed mizzen, and were sometimes reduced to lie at the mercy of the waves under our bare poles, yet now and then we ventured to make sail with our courses double reefed; and the weather proving more tolerable, would perhaps encourage us to set our topsails; after which, the wind, without any previous notice, would return upon us with redoubled force,

and would in an instant tear our sails from the spars. And that no circumstance might be wanting which could aggrandize our distress, these blasts generally brought with them a great quantity of snow and sleet, which cased our rigging, and froze our sails, thereby rendering them and our cordage brittle, and apt to snap upon the slightest strain, adding great difficulty and labor to the working of the ship, benumbing the limbs of our people, and making them incapable of exerting themselves with their usual activity, and even disabling many of them, by mortifying their toes and fingers."

April came. The cold was extreme; squalls of rain and snow were frequent and the vessels shipped great quantities of water. The *Centurion*, from being buffeted by these angry seas, " was now grown so loose in her upper works, that she let in the water at every seam, so that every part within board was constantly exposed to the sea-water, and scarcely any of the officers ever lay in dry beds. Indeed it was very rare, that two nights ever passed without many of them being driven from their beds, by the deluge of water that came upon them."

The berth deck was deluged with cold sea water which slopped over the planks and dripped from the deck above. We can imagine the misery of the old soldiers from Chelsea Hospital who formed Anson's landing forces as they sought shelter from the dripping water and thought of England in April, with her smiling skies, green fields, and spring flowers bursting into bloom.

Violent storms of wind, hail, and rain accompanied by great seas continued. Sails were blown to rags, yards were sprung and the rigging required constant repair; for days the vessels of the squadron lay to under bare poles.

Once the *Centurion* became separated from the rest of the squadron and Chaplain Walter tells us: "As our ship kept the wind better than any of the rest, we were obliged, in the afternoon, to wear ship, in order to join the squadron to the leeward, which otherwise we should have been in danger of losing in the night. And as we dared not venture any sail abroad, we were obliged to make use of an expedient, which answered our purpose; this was putting the helm a weather, and manning the fore shrouds: But though this method proved successful for the end intended, yet in the execution of it, one of our ablest seaman was canted overboard, and notwithstanding the prodigious agitation of the waves, we perceived that he swam very strong, and it was with the utmost concern that we found ourselves incapable of assisting him; and we were the more grieved at his unhappy fate, since we lost sight of him struggling with the waves, and conceived from the manner in which he swam that he might continue sensible for a considerable time longer of the horror attending his irretrievable situation."

Ever since leaving the Strait of Le Marie the vessels had endeavored to work to the southwest, and when the navigators thought themselves well to the westward of Terra del Fuego they were amazed to discover ahead of them, one morning, a rocky headland which they determined was a point of land termed Cape Noir, situated near the western entrance of the Straits of Magellan. Two of the vessels were missing, perhaps dashed to pieces against the rocky coast for they were never seen again.

We will continue the narrative in Chaplain Walter's own words as his account of those days at sea on board the *Centurion* gives us a vivid picture of the conditions and hardships encountered during the long voyages of the eighteenth century:

"After the mortifying disappointment of falling in with the coast of Terra del Fuego, when we esteemed ourselves ten degrees to the westward of it, we stood away to the SW. till the 22d of April, when we were in upwards of 60° of south latitude, and by our account near 6° to the westward of Cape Noir; and in this run, we had a series of as favourable weather, as could well be expected in that part of the world, even in a better season; So that this interval, setting the inquietude of our thoughts aside, was by far the most eligible of any we enjoyed from Streights Le Marie to the west coast of America. This moderate weather continued, with little variation, till the 24th; but on the 24th, in the evening, the wind began to blow fresh, and soon increased to a prodigious storm; and the weather being extremely thick, about midnight we lost sight of the other four ships of the squadron, which, notwithstanding the violence of the preceding storms, had hitherto kept in company with us. Nor was this our sole misfortune; for, the next morning, endeavouring to hand the top-sails, the clew-lines and bunt-lines broke, and the sheets being half flown, every seam in the top-sails was soon split from top to bottom, and the main top-sail shook so strongly in the wind, that it carried away the top lanthorn, and endangered the head of the mast; however, at length some of the most daring of our men ventured upon the yard, and cut the sail away close to the reefs, though with the utmost hazard of their lives. At the same time, the foretopsail beat about the yard with so much fury, that it was soon blown to pieces; and that we might have full employment, the mainsail blew loose, which obliged us to lower down the yard to secure the sail, and the foreyard being likewise lowered, we lay to under a mizzen; And besides the loss of our topsails, we had much of our other rigging broke, and lost a main studding-sail-boom out of the chains.

"On the 25th, about noon, the weather became more moderate, which enabled us to sway up our yards and to repair, in the best manner we could, our shattered rigging; but still we had no sight

of the rest of our squadron, nor indeed were we joined by any of them again till after our arrival at Juan Fernandes, nor did any two of them, as we have since learned, continue in company together. And this total separation was the more wonderful, as we had hitherto kept together for seven weeks, through all the reiterated tempests of this turbulent climate. It must indeed be owned that this separation gave us room to expect that we might make our passage in a shorter time than if we had continued together, because we could now make the best of our way without being retarded by the misfortunes of the other ships; but then we had the melancholy reflection that we ourselves were hereby deprived of the assistance of others, and our safety would depend upon our single ship; so that if a plank started, or any other accident of the same nature should take place, we must all irrecoverably perish: or should we be driven on shore, we had the uncomfortable prospect of ending our days on some desolate coast, without any reasonable hope of ever getting away; whereas with another ship in company all these calamities are much less formidable, since in every kind of danger there would be some probability that one ship at least might escape, and might be capable of preserving or relieving the crew of the other.

"The remaining part of this month of April we had generally hard gales, although we had been every day, since the 22d, edging to the northward; however, on the last day of the month, we flattered ourselves with the hopes of soon terminating all our sufferings, for we that day found ourselves in the latitude of 52° 13′, which being to the northward of the Streights of Magellan, we were assured that we had completed our passage, and had arrived in the confines of the southern Ocean: and this Ocean being nominated Pacifick, from the equability of the seasons which are said to prevail there, and the facility and security with which navigation is there carried on, we doubted not but we should be speedily cheared with the moderate gales, the smooth water, and the temperate air for which that tract of the globe has been so renowned. And under the influence of these pleasing circumstances we hoped to experience some kind of compensation; for the complicated miseries which had so constantly attended us for the last eight weeks. But here we were again disappointed; for in the succeeding month of May, our sufferings rose to a much higher pitch than they had ever yet done, whether we consider the violence of the storms, the shattering of our sails and rigging, or the diminishing and weakening of our crew by deaths and sickness, and the probable prospect of our total destruction. All this will be sufficiently evident from the following circumstantial account of our diversified misfortunes.

"Soon after our passing Streights Le Maire, the scurvy began to make its appearance amongst us; and our long continuance at sea, the fatigue we underwent, and the various disappointments we met with, had occasioned its spreading to such a degree, that at the latter end of April there were but few on board, who were not in some degree afflicted with it, and in that month no less than forty-three died of it on board the *Centurion*. But though we thought that the distemper had then risen to an extraordinary height, and were willing to hope, that as we advanced to the northward its malignity would abate, yet we found, on the contrary, that in the month of May we lost near double that number: And as we did not get to land till the middle of June, the mortality went on increasing, and the disease extended itself so prodigiously, that after the loss of above two hundred men, we could not at last muster more than six fore-mast men in a watch capable of duty.

"This disease so frequently attending all long voyages, and so particularly destructive to us, is surely the most singular and unaccountable of any that affects the human body. For its symptoms are inconstant and innumerable, and its progress and effects extremely irregular; for scarcely any two persons have the same complaints, and where there hath been found some conformity in the symptoms, the order of their appearance has been totally different. However, though it frequently puts on the form of many other diseases, and is therefore not to be described by any exclusive and infallible criterions; yet there are some symptoms which are more general than the rest, and therefore, occurring the oftnest, deserve a more particular enumeration. These common appearances are large discoloured spots dispersed over the whole surface of the body, swelled legs, putrid gums, and above all, an extraordinary lassitude of the whole body, especially after any exercise, however inconsiderable; and this lassitude at last degenerates into a proneness to swoon on the least exertion of strength, or even on the least motion.

"This disease is likewise usually attended with a strange dejection of the spirits, and with shiverings, tremblings, and a disposition to be seized with the most dreadful terrors on the slightest accident. Indeed it was most remarkable, in all our reiterated experience of this malady, that whatever discouraged our people, or at any time damped their hopes, never failed to add new vigour to the distemper; for it usually killed those who were in the last stages of it, and confined those to their hammocks, who were before capable of some kind of duty; so that it seemed as if alacrity of mind, and sanguine thoughts, were no contemptible preservatives from its fatal malignity.

"But it is not easy to compleat the long roll of the various concomitants of this disease; for it often produced putrid fevers, pleuri-

sies, the jaundice, and violent rheumatick pains, and sometimes it occasioned an obstinate costiveness, which was generally attended with a difficulty of breathing; and this was esteemed the most deadly of all the scorbutick symptoms: At other times the whole body, but more especially the legs, were subject to ulcers of the worst kind, attended with rotten bones, and such a luxuriancy of funguous flesh, as yielded to no remedy. But a most extraordinary circumstance, and what would be scarcely credible upon any single evidence, is, that the scars of wounds which had been for many years healed, were forced open again by this virulent distemper: Of this, there was a remarkable instance in one of the invalids on board the *Centurion*, who had been wounded above fifty years before at the battle of the Boyne; for though he was cured soon after, and had continued well for a great number of years past, yet on his being attacked by the scurvy, his wounds, in the progress of his disease, broke out afresh, and appeared as if they had never been healed; Nay, what is still more astonishing; the callous of a broken bone, which had been compleatly formed for a long time, was found to be hereby dissolved, and the fracture seemed as if it had never been consolidated. Indeed, the effects of this disease were in almost every instance wonderful: for many of our people though confined to their hammocks, appeared to have no inconsiderable share of health, for they eat and drank heartily, were chearful, and talked with much seeming vigour, and with a loud strong tone of voice; and yet on their being the least moved, though it was only from one part of the ship to the other, and that in their hammocks, they have immediately expired; and others, who have confided in their seeming strength, and have resolved to get out of their hammocks, have died before they could well reach the deck; and it was no uncommon thing for those who were able to walk the deck, and to do some kind of duty, to drop down dead in an instant, on any endeavours to act with their utmost vigour, many of our people having perished in this manner during the course of this voyage.

"With this terrible disease we struggled the greatest part of the time of our beating round Cape Horn; and though it did not then rage with its utmost violence, yet we buried no less than forty-three men on board the *Centurion*, in the month of April as hath been already observed, but we still entertained hopes, that when we should have once secured our passage round the Cape, we should put a period to this, and all the other evils which had so constantly pursued us. But it was our misfortune to find that the Pacifick Ocean was to us less hospitable than the turbulent neighborhood of Terra del Fuego and Cape Horn: For being arrived, on the 8th of May, off the Island of Socoro, which was the first rendezvous appointed for the squadron, and where we hoped to have met with some of our companions, we cruized for them in that station several days. And here we were

not only disappointed in our hopes of being joined by our friends, and were thereby induced to favor the gloomy suggestions of their having all perished; but we were likewise perpetually alarmed with the fears of being driven on shore upon this coast, which appeared too craggy and irregular to give us the least hopes, that in such a case any of us could possibly escape immediate destruction. For the land had indeed a most tremendous aspect: The most distant part of it, and which appeared far within the country, being the mountains usually called the Andes or Cordilleras, was extremely high, and covered with snow; and the coast itself seemed quite rocky and barren, and the water's edge skirted with precipices. In some places indeed there appeared several deep bays running into the land, but the entrance into them was generally blocked up by numbers of little Islands; and though it was not improbable but there might be convenient shelter in some of those bays, and proper channels leading thereto; yet as we were utterly ignorant of the coast, had we been driven ashore by the western winds which blew almost constantly here, we did not expect to have avoided the loss of our ships and of our lives.

"And this continued peril, which lasted for above a fortnight, was greatly aggravated by the difficulties we found in working the ship, as the scurvy had by this time destroyed so great a part of our hands, and had in some degree affected almost the whole crew. Nor did we, as we hoped, find the winds less violent, as we advanced to the northward, for we had often prodigious squalls which split our sails, greatly damaged our rigging, and endangered our masts. Indeed, during the greatest part of the time we were upon this coast, the wind blew so hard that in another situation, where we had sufficient sea-room, we should certainly have lain to; but in the present exigency we were necessitated to carry both our courses and top-sails, in order to keep clear of this lee-shore. In one of these squalls, which was attended by several violent claps of thunder, a sudden flash of fire darted along our decks, which, dividing, exploded with a report like that of several pistols, and wounded many of our men and officers as it passed, marking them in different parts of the body: this flame was attended with a strong sulphurous stench and was doubtless of the same nature with the larger and more violent blasts of lightning which then filled the air.

"It were endless to recite minutely the various disasters, fatigues and terrors which we encountered on this coast: all these went on increasing till the 22d of May, at which time, the fury of all the storms which we had hitherto encountered, seemed to be combined, and to have conspired our destruction. In this hurricane almost all our sails were split, and great part of our standing rigging broken; and, about eight in the evening a mountainous overgrown-sea took

us upon our starboard-quarter, and gave us so prodigious a shock, that several of our shrouds broke with the jerk, by which our masts were greatly endangered; our ballast and stores too were so strangely shifted, that the ship heeled afterwards two streaks to port. Indeed it was a most tremendous blow, and we were thrown into the utmost consternation from the apprehension of instantly foundering; and though the wind abated in a few hours, yet as we had no more sails left in a condition to bend to our yards, the ship laboured very much in a hollow sea, rolling gunwale to, for want of sail to steady her: So that we expected our masts, which were now very slenderly supported, to come by the board every moment. However, we exerted ourselves the best we could to stirrup our shrouds, to reeve new lanyards, and to mend our sails; but while these necessary operations were carrying on, we ran great risque of being driven on shore on the Island of Chiloe, which was not far distant from us; but in the midst of our peril the wind happily shifted to the southward, and we steered off the land with the main-sail only, the Master and myself undertaking the management of the helm, while every one else on board was busied in securing the masts, and bending the sails as fast as they could be repaired. This was the last effort of that stormy climate; for in a day or two after, we got clear of the land, and found the weather more moderate than we had yet experienced since our passing Streights Le Marie. And now having cruized in vain for more than a fortnight in quest of the other ships of the squadron, it was resolved to take the advantage of the present favourable season and the offing we had made from this terrible coast, and to make the best of our way for the Island of Juan Fernandes. For though our next rendezvous was appointed off the harbour of Baldivia, yet as we had hitherto seen none of our companions at this first rendezvous, it was not to be supposed that any of them would be found at the second: Indeed we had the greatest reason to suspect, that all but ourselves had perished. Besides, we were by this time reduced to so low a condition, that instead of attempting to attack the places of the enemy, our utmost hopes could not suggest to us the possibility of saving the ship, and some part of the remaining enfeebled crew, by our speedy arrival at Juan Fernandes; for this was the only road in that part of the world where there was any probability of our recovering our sick, or refitting our vessel, and consequently our getting thither was the only chance we had left to avoid perishing at sea.

"Our deplorable situation then allowing no room for deliberation we stood for the Island of Juan Fernandes; and to save time, which was now extremely precious, (our men dying four, five and six in a day) and likewise to avoide being engaged again with a lee-shore

we resolved, if possible, to hit the Island upon a meridian. And, on the 28th of May, being nearly in the parallel upon which it is laid down, we had great expectations of seeing it: But not finding it in the position in which the charts had taught us to expect it, we began to fear that we had got too far to the westward; and therefore, though the Commodore himself was strongly persuaded, that he saw it on the morning of the 28th, yet his Officers believing it to be only a cloud, to which opinion the haziness of the weather gave some kind of countenance, it was, on a consultation, resolved to stand to the eastward, in the parallel of the Island; as it was certain, that by this course we should either fall in with the Island, if we were already to the westward of it; or should at least make the main-land of Chili, from whence we might take a new departure and assure ourselves, by running to the westward afterwards, of not missing the Island a second time.

"On the 30th of May we had a view of the Continent of Chili, distant about twelve or thirteen leagues; the land made exceeding high and uneven, and appeared quite white; what we saw being doubtless a part of the Cordilleras, which were always covered with snow. Though by this view of the land we ascertained our position, yet it gave us great uneasiness to find that we had so needlessly altered our course, when we were, in all probability just upon the point of making the Island; for the mortality amongst us was now encreased to a most dreadful degree, and those who remained alive were utterly dispirited by this new disappointment, and the prospect of their longer continuance at sea: Our water too began to grow scarce; so that a general dejection prevailed amongst us, which added much to the virulence of the disease, and destroyed numbers of our best men; and to all these calamities there was added this vexatious circumstance, that when, after having got a sight of the Main, we tacked and stood to the westward in quest of the Island, we were so much delayed by calms and contrary winds, that it cost us nine days to regain the westing, which, when we stood to the eastward, we ran down in two. In this desponding condition, with a crazy ship, a great scarcity of fresh water, and a crew so universally diseased, that there were not above ten fore-mast men in a watch capable of doing duty, and even some of these lame, and unable to go aloft: Under these disheartning circumstances, I say, we stood to the westward; and, on the 9th of June, at day-break, we at last discovered the long-wished for Island of Juan Fernandes, bearing N. by E. $\frac{1}{2}$ E. at eleven or twelve leagues distance. And though, on this first view, it appeared to be a very mountainous place, extremely ragged and irregular; yet as it was land, and the land we sought for, it was to us a most agreeable sight: For at this place only we could hope to put a period to those terrible calamities,

we had so long struggled with, which had already swept away above half our crew, and which, had we continued a few days longer at sea, would inevitably have compleated our destruction. For we were by this time reduced to so helpless a condition, that out of two hundred and odd men which remained alive, we could not, taking all our watches together, muster hands enough to work the ship on an emergency, though we included the officers, their servants, and the boys.

" The wind being northerly when we first made the Island, we kept plying all that day, and the next night, in order to get in with the land; and wearing the ship in the middle watch, we had a melancholy instance of the almost incredible debility of our people; for the Lieutenant could muster no more than two Quarter-masters, and six Foremast men capable of working; so that without the assistance of the officers, servants and the boys, it might have proved impossible for us to have reached the Island, after we had got sight of it; and even with this assistance they were two hours in trimming the sails; To so wretched a condition was a sixty gun ship reduced, which had passed Streights Le Maire but three months before, with between four and five hundred men, almost all of them in health and vigour.

" However, on the 10th in the afternoon, we got under the lee of the Island, and kept ranging along it, at about two miles distance, in order to look out for the proper anchorage, which was described to be in a bay on the North side. And now being nearer in with the shore, we could discover that the broken craggy precipices, which had appeared so unpromising at a distance, were far from barren, being in most places covered with woods; and that between them there were every where interspersed the finest vallies, clothed with a most beautiful verdure, and watered with numerous streams and cascades, no valley, of any extent, being unprovided of its proper rill. The water too, as we afterwards found, was not inferiour to any we had ever tasted, and was constantly clear: So that the aspect of this country would, at all times, have been extremely delightful, but in our distressed situation, languished as we were for the land and its vegetable productions, (an inclination constantly attending every stage of the sea-scurvy) it is scarcely credible with what eagerness and transport we viewed the shore, and with how much impatience we longed for the greens and other refreshments which were then in sight, and particularly for the water, for of this we had been confined to a very sparing allowance for a considerable time, and had then but five ton remaining on board. Those only who have endured a long series of thirst, and who can readily recall the desire and agitation which the ideas alone of springs and brooks have at that time raised in them, can judge of the emotion with which we eyed a large cascade of the most transparent water, which poured itself

from a rock near a hundred feet high into the sea, at a small distance from the ship. Even those amongst the diseased, who were not in the very last stages of the distemper, though they had been long confined to their hammocks, exerted the small remains of strength that was left them, and crawled up to the deck to feast themselves with this reviving prospect. Thus we coasted the shore, fully employed in the contemplation of this diversified landskip, which still improved upon us the farther we advanced. But at last the night closed upon us, before we had satisfied ourselves which was the proper bay to anchor in; and therefore we resolved to keep in soundings all night, (we having then from sixty-four to seventy fathom) and to send our boat next morning to discover the road: However, the current shifted in the night, and set us so near the land, that we were obliged to let go the best bower anchor in fifty-six fathom, not half a mile from the shore. At four in the morning, the Cutter was dispatched with our third Lieutenant to find out the bay we were in search of, who returned again at noon with the boat laden with seals and grass; for though the Island abounded with better vegetables, yet the boats-crew, in their short stay, had not met with them; and they well knew that even grass would prove a dainty, and indeed it was all soon and eagerly devoured. The seals too were considered as fresh provision; but as yet were not much admired, tho' they grew afterwards into more repute: For what rendered them less valuable at this juncture, was the prodigious quantity of excellent fish, which the people on board had taken, during the absence of the boat.

"The Cutter, in this expedition, had discovered the bay where we intended to anchor, which we found was to the westward of our present station; and, the next morning, the weather proving favourable, we endeavoured to weigh, in order to proceed thither: But though, on this occasion, we mustered all the strength we could, obliging even the sick, who were scarce able to keep on their leggs, to assist us; yet the capstan was so weakly manned, that it was near four hours before we hove the cable right up and down: After which, with our utmost efforts, and with many surges and some purchases we made use of to encrease our power, we found ourselves incapable of starting the anchor from the ground. However, at noon, as a fresh gale blew towards the bay, we were induced to set the sails, which fortunately tripped the anchor; on which we steered along shore, till we came a-breast of the point that forms the eastern part of the bay. On the opening of the bay, the wind, that had befriended us thus far, shifted and blew from thence in squalls; but by means of the head-way we had got, we loosed close in, till the anchor brought us up in fifty-six fathom. Soon after we had thus got to our new birth,

we discovered a sail, which we made no doubt was one of our squadron; and on its nearer approach, we found it to be the *Tryal* Sloop. We immediately sent some of our hands on board her, by whose assistance she was brought to an anchor between us and the land. We soon found that the Sloop had not been exempted from those calamities which we had so severely felt; for her Commander, Captain Saunders, waiting on the Commodore, informed him, that out of his small complement, he had buried thirty-four of his men; and those that remained were so universally afflicted with the scurvy, that only himself, his Lieutenant, and three of his men, were able to stand by the sails. The *Tryal* came to an anchor within us, on the 12th, about noon, and we carried our hawsers on board her, in order to moor ourselves nearer in shore; but the wind coming off the land in violent gusts, prevented our mooring in the birth we intended, especially as our principal attention was now employed on business rather of more importance: for we were now extremely occupied in sending on shore materials to raise tents for the reception of the sick, who died apace on board, and doubtless the distemper was considerably augmented, by the stench and filthiness in which they lay; for the number of the diseased was so great, and so few could be spared from the necessary duty of the sails to look after them, that it was impossible to avoid a great relaxation in the article of cleanliness, which had rendered the ship extremely loathsome between decks. But notwithstanding our desire of freeing the sick from their hateful situation, and their own extreme impatience to get on shore, we had not hands enough to prepare the tents for their reception before the 16th; but on that and the two following days we sent them all on shore, amounting to a hundred and sixty-seven persons, besides at least a dozen who died in the boats, on their being exposed to the fresh air. The greatest part of our sick were so infirm, that we were obliged to carry them out of the ship in their hammocks, and to convey them afterwards in the same manner from the water-side to their tents, over a stony beach. This was a work of considerable fatigue to the few who were healthy, and therefore the Commodore, with his accustomed humanity, not only assisted herein with his own labour, but obliged his Officers, without distinction, to give their helping hand. The extreme weakness of our sick may in some measure be collect from the numbers who died after they had got on shore; for it had generally been found, that the land, and the refreshments it produces, very soon recover most stages of the sea-scurvy: and we flattered ourselves, that those who had not perished on this first exposure to the open air, but had lived to be placed in their tents, would have been speedily restored to their health and vigour: But, to our great mortification, it was near twenty days after their landing, be-

fore the mortality was tolerably ceased; and for the first ten or twelve days, we buried rarely less than six each day, and many of those, who survived, recovered by very slow and insensible degrees. Indeed, those who were well enough at their first getting on shore, to creep out of their tents, and crawl about, were soon relieved, and recovered their health and strength in a very short time; but in the rest, the disease seemed to have acquired a degree of inveteracy which was altogether without example.

"The arrival of the Tryal Sloop at this Island, so soon after we came there ourselves, gave us great hopes of being speedily joined by the rest of the squadron; and we were for some days continually looking out, in expectation of their coming in sight. But near a fortnight being elapsed, without any of them having appeared, we began to despair of ever meeting them again; as we knew that had our ship continued so much longer at sea, we should every man of us have perished, and the vessel, occupied by dead bodies only, would have been left to the caprice of the winds and waves: And this we had great reason to fear was the fate of our consorts, as each hour added to the probability of these desponding suggestions.

"But on the 21st of June, some of our people, from an eminence on shore, discerned a ship to leeward, with her courses even with the horizon; and they, at the same time, particularly observed, that she had no sail abroad except her courses and her main top-sail. This circumstance made them conclude that it was one of our squadron, which had probably suffered in her sails and rigging as severely as we had done: But they were prevented from forming more definite conjectures about her; for, after viewing her for a short time, the weather grew thick and hazy, and they lost sight of her. On this report, and no ship appearing for some days, we were all under the greatest concern, suspecting that her people were in the utmost distress for want of water, and so diminished and weakened by sickness, as not to be able to ply up to windward; so that we feared, that, after having been in sight of the Island, her whole crew would notwithstanding perish at sea However, on the 26th, towards noon, we discerned a sail in the North East quarter, which we conceived to be the very same ship that had been seen before, and our conjectures proved true; and about one o'clock she approached so near, that we could distinguish her to be the *Gloucester*. As we had no doubt of her being in great distress, the Commodore immediately ordered his boat to her assistance, laden with fresh water, fish and vegetables, which was a very seasonable relief to them; for our apprehensions of their calamities appeared to be but too well grounded, as perhaps there never was a crew in a more distressed situation. They had already thrown over-board two-thirds of their complement, and of

those that remained alive, scarcely any were capable of doing duty, except the officers and their servants. They had been a considerable time at the small allowance of a pint of fresh water to each man for twenty-four hours, and yet they had so little left, that, had it not been for the supply we sent them, they must soon have died of thirst. The ship plied in within three miles of the bay; but, the winds and currents being contrary, she could not reach the road. However, she continued in the offing the next day, but had no chance of coming to an anchor, unless the wind and currents shifted; and therefore the Commodore repeated his assistance, sending to her the *Tryal's* boat manned with the *Centurion's* people, and a farther supply of water and other refreshments. Captain Mitchel, the Captain of the *Gloucester*, was under a necessity of detaining both this boat and that sent the preceding day; for without the help of their crews he had no longer strength enough to navigate the ship. In this tantalizing situation the *Gloucester* continued for near a fortnight, without being able to fetch the road, though frequently attempting it, and at some times bidding very fair for it. On the 9th of July, we observed her stretching away to the eastward at a considerable distance, which we supposed was with a design to get to the southward of the Island; but as we soon lost sight of her, and she did not appear for near a week, we were prodigiously concerned, knowing that she must be again in extreme distress for want of water. After great impatience about her, we discovered her again on the 16th, endeavoring to come round the eastern point of the Island; but the wind, still blowing directly from the bay, prevented her getting nearer than within four leagues of the land. On this, Captain Mitchel made signals of distress, and our long boat was sent to him with a store of water, and plenty of fish, and other refreshments. And the long-boat being not to be spared, the Cockswain had positive orders from the Commodore to return again immediately; but the weather proving stormy the next day, and the boat not appearing, we much feared she was lost, which would have proved an irretrievable misfortune to us all: But, the 3d day after, we were relieved from this anxiety, by the joyful sight of the long-boat's sails upon the water; and we sent the Cutter immediately to her assistance, who towed her along side in a few hours. The crew of our long boat had taken in six of the *Gloucester's* sick men to bring them on shore, two of which died in the boat. And now we learnt that the *Gloucester* was in a most dreadful condition, having scarcely a man in health on board, except those they received from us; and, numbers of their sick dying daily, we found that, had it not been for the last supply sent by our long-boat, both the health and diseased must have all perished together for want of water. And these calamities were the most terrifying, as they appeared to be without remedy: For the *Gloucester* had already spent a month

her endeavors to fetch the bay, and she was now no further advanced than at the first moment she made the Island; on the contrary, the people on board her had worn out all their hopes of ever succeeding in it, by the many experiments they had made of its difficulty. Indeed, the same day her situation grew more desperate than ever, for after she had received our last supply of refreshments, we again lost sight of her; so that we in general despaired of her ever coming to an anchor.

"Thus was this unhappy vessels bandied about within a few leagues of her intended harbour, whilst the neighbourhood of that place and of those circumstances, which could alone put an end to the calamities they laboured under, served only to aggravate their distress, by torturing them with a view of the relief it was not in their power to reach. But she was at last delivered from this dreadful situation, at a time when we least expected it; for after having lost sight of her for several days, we were pleasantly surprized, on the morning of the 23d of July, to see her open the N. W. point of the bay with a flowing sail; when we immediately dispatched what boats we had to her assistance, and in an hour's time from our first perceiving her, she anchored safe within us in the bay. And now we were more particularly convinced of the importance of the assistance and refreshments we so often sent them, and how impossible it would have been for a man of them to have survived, had we given less attention to their wants; for notwithstanding the water, the greens, and fresh provisions which we supplied them with and the hands we sent them to navigate the ship, by which the fatigue of their own people was diminished, their sick relieved, and the mortality abated; notwithstanding this indulgent care of the Commodore, they yet buried three fourths of their crew, and a very small proportion of the remainder were capable of assisting in the duty of the ship. On their coming to an anchor, our first care was to assist them in mooring, and our next to send the sick on shore: These were now reduced by deaths to less than fourscore, of which we expected to lose the greatest part; but whether it was, that those farthest advanced in the distemper were all dead, or that the greens and fresh provisions we had sent on board had prepared those which remained for a more speedy recovery, it happened contrary to our expectations, that their sick were in general relieved and restored to their strength, in a much shorter time than our own had been when we first came to the Island, and very few of them died on shore."

THE END.

EDITORIAL.

ON THE MAKING OF ABSTRACTS.

Since the first issue of the United States Naval Medical Bulletin, its various editors have attempted to present to its readers in the section devoted to the Progress in Medical Sciences, a goodly assortment of abstracts of articles of special professional interest to the service appearing in foreign and domestic journals. As a rule, each editor has had to rely on a small group of men, having the service at heart, for these abstracts, although many have been prepared by the editor himself.

A number of medical journals publish abstracts which more or less cover the entire field of medical activity; but these journals are only available to medical officers on duty in hospitals or on hospital ships. The doctor serving on a cruising ship or at a shore station either at home or abroad, receives one or two journals which contain abstracts of articles of interest to the medical profession at large, but he has come to depend on the Bulletin to furnish him with abstracts of those articles appearing in the current medical literature which are of especial interest to the naval medical officer. It has been the aim of each editor to make this section of the Bulletin as useful as possible to the medical officer who has not ready access to a large medical library.

The making of abstracts, preferably of medical writings, is valuable practice for any medical officer, not only from a literary viewpoint but from the standpoint of the reviewer gaining a knowledge of the subject reviewed. The process requires careful reading, some power of penetration and the ability to pick out the main features in the article reviewed, and the expression of them in the reviewer's own style of writing.

Although most of the abstracts published are made by members of the teaching staff at the U. S. Naval Medical School, the Bulletin extends an invitation to all medical officers to submit abstracts of articles bearing on naval medical practice, from the medical publications to which they have access. All abstracts received can not be published for obvious reasons, but each one will be given careful consideration and the best will be used for the Bulletin.

In preparing abstracts reviewers should follow strictly the uniform style in headings and captions which has been used in recent issues. It will be noticed that the author's surname comes first and

ollowed by his initials. Then comes the exact title of the article eviewed and lastly the name of the publication in which it appears ith the date of the issue. For example:

Flack, M. Simple tests of physical efficiency. The Lancet, London, February 8, 1919.

From Gay's "Writing through Reading" we glean the following oncerning the making of abstracts:

"An abstract is a concise abridgement containing the substance of full statement; a concise and lucid summary of a larger passage. he main qualities to be aimed at in making an abstract are accuacy, completeness, clearness, and brevity; and this list indicates the ducational value of the exercise. The making of abstracts is one f the best means of developing the power of penetration, of seizng upon salient parts in a passage, and expressing these in clear, igorous speech. It gives training in reading and writing equally, t necessitates close attention, it inculcates the duty of clearness. o these values it adds a very practical discipline in conciseness.

"Skill in abstract making increases rapidly with practice. At irst, however, the student should learn the best procedure or technic nd should conscientiously follow it, even though later he may be ble to skip some of the steps. The procedure is as follows:

"1. Read the original over two or three times until you have a lear idea of its purport. Devise a title for the whole passage.

"2. Try to divide the original into sections and write a heading or each section.

"3. Decide what is essential and what is unessential in each section.

"4. Determine what emphasis to give to the thought of each section; that is, what space to give it in your version.

"5. Write a clear and orderly condensed version, incorporating n it all the essential thought of the original and adding nothing f your own.

"6. Revise your version for further condensation.

"Two warnings are necessary: Be careful not to make the begining of your abstract too full, and the end too scanty or hurried; nd be fair to the sentiment or tendency of your original, even hough you do not agree with it.

"Nothing will more mercilessly discover wordiness, looseness, or inness of thought in a passage than to make an abstract of it. wo very important principles must be constantly kept in mind: hile the special object in abstracting is brevity, the *essential* uality of an abstract is clearness; and the test of clearness is that *e abstract shall be intelligible to a reader who has not seen the iginal.*

"When the abstract is completed we may carry the process of condensation still further until we are able to express the central thought of each passage in a single sentence which is called the *summary* sentence. If our original has the quality of unity of thought, to express its kernal in so brief a form is usually not very difficult. The making of summarzing sentences is not only a profitable exercise in hard thinking, but offers one of the best means for testing the unity of thought of whatever we read."

ON THE EXPRESSION OF VISUAL ACUITY IN MEDICAL REPORTS.

In ordinary ophthalmic practice the record of the visual acuity is usually made in the form of fractions, using Arabic or Roman notation; figures usually indicate feet, and Roman letters usually signify meters, though there is no fixed rule for this. However expressed, the denominator indicates the size of the type which the eye reads at the distance indicated by the numerator. In naval practice, however, a different system has been in vogue for such a long time as to be familiar to officers throughout the service, either of the line or staff, and for obvious reasons it is highly desirable to adhere to it. Every line officer before his graduation from the Naval Academy has become familiar with such expressions as vision: Right eye 18/20, left eye 10/20, etc., and he knows that an individual with 10/20 vision has only half of the visual acuity he should have.

The bureau receives from time to time reports of medical surveys and other medical records in which acuity of vision is expressed as 20/50, 20/100, 20/200, 20/30, etc., and while the medical officer readily appreciates the defect in vision which these fractions denote the defect so expressed is an insolvable puzzle to officers of other branches of the service who from repeated physical examination have become conversant with the expression of visual acuity in terms of twentieths. It was for this reason that the third sentence from the last in paragraph 2074 was inserted in the Manual for the Medical Department:

"Vision is to be expressed as a fraction, of which the numerator shall be the distance at which Snellen's 20-foot test can be determined, and the denominator 20."

SUGGESTED DEVICES.

A FORM "X" CARD.

By A. FARENHOLT, Captain, Medical Corps, United States Navy.

A modified Form "X" card designed especially for use at recruiting stations was devised in 1916 and has been in continuous use at the United States Navy Recruiting Station, San Francisco, Calif., since that time. The face of the card is as follows:

Date.	Name in full.	Rate.

Born in..... Date.....

Age.		Height.	Weight.	Eyes.	Hair.	Comp.	Chest.			Color. percp.	Vision.		Hearing.	
Yrs.	Mos.						M.	Exp.	Insp.		R.	L.	R.	L.
				No.							20	20	15	15

WHEN AND WHERE LAST EXAMINED	Accepted
Date..... Where.....	Ex. Surg.

Former diseases or injuries.....

.....

Former occupations.....

Name and address next of kin.....

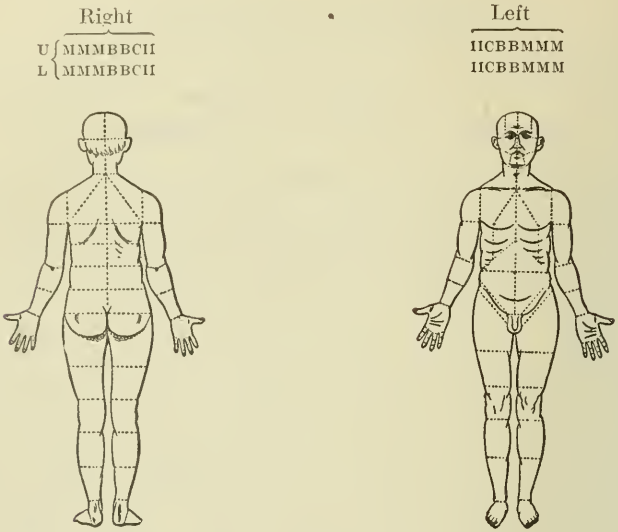
.....

Religion..... C. S. C. No. ..... No. vac. scars.....

Previous service.....years.....

Abnormalities or peculiarities.

On the reverse of the card are two outline figures for recording marks, scars, or deformities, and an outline for recording defective or missing teeth.



As will be readily seen the card affords in addition to the data on the regulation Form "X" card additional information of use to the medical examiner and constitutes a permanent record to be retained at the recruiting station useful for reference and to supply facts necessary to reproduce lost papers, such as shipping articles, service records, and health records.

CLINICAL NOTES.

RESULTS OF REFRACTION OF SEVENTY-SIX MIDSHIPMEN.

By F. A. Hughes, Lieutenant, Medical Corps, United States Navy.

At the annual physical examination of midshipmen at the United States Naval Academy, February, 1921, there were 79 men who failed to attain the required "15/20 vision in each eye." The board of medical examiners, instead of rejecting them, recommended that they be reexamined before the end of the academic year. This recommendation was made in order to determine whether their vision would improve sufficiently to pass the required test after having worn their correcting glasses for this length of time. The physical examination is held annually just after the mid-year examinations when it is to be expected that the results of eye strain would be most manifest. As observation in former years has shown that a large percentage of these midshipmen can be saved to the service, thereby effecting a saving of the cost of their education, it has been considered good policy to continue the practice of giving them a reexamination before a final rejection is made.

These midshipmen who failed were given a careful refraction under mydriatic and a correction post mydriatic before their reexamination, and were required to wear this correction constantly until they left for their Practice Cruise. The cause of low vision in these cases was due to low myopia and myopic astigmatism. It is obvious that this number of refractions consumed considerable time, so that these midshipmen wore their correcting glasses for varying lengths of time before their reexamination on April 25, 1921. At the time of this examination three of the 79 had resigned, so no further count is taken of them. Of the 76 who were reexamined 36 (10 of them members of the first class) passed the required vision test. The board then further recommended that all, except members of the first class who failed to pass at this time, be allowed to go on the Summer Practice Cruise and again be reexamined before going on September leave. The board also recommended that all members of the first class be allowed to graduate and be held until September for reexamination before being given their commissions. The 17 members of the first class who were reexamined here passed and 2 were passed by the bureau, thus saving to the Navy 19 officers whose four years' training had been acquired at great expense to the Government.

The second reexamination of the 31 who went on the cruise was made August 30 and resulted in the acceptance of all but three of these, making the total acceptances 96 per cent of those who had failed in February. These three were finally rejected, as it was the

opinion of the board that sufficient time had been given them for all the improvement that would probably occur in their cases.

The study of this number of cases, and about 200 more not herein recorded, all subjected to practically the same conditions as regards study, exercise, and living shows:

(*a*) That the arbitrary requirement of 20/20 vision for all candidates is only "a rule of thumb" and is no indication that there might not be an error of refraction existing and that it would be very desirable to know the exact status of the refraction of all candidates for the Academy.

(*b*) That the intensive study required of the midshipmen brings out, in nearly all cases, any latent error of refraction, and in myopes tends to increase the myopia.

(*c*) That in young adults who are required to do a great amount of close work irreparable damage may be done to the eyes unless they are carefully refracted and close check kept on their condition during the period of their intensive close work.

(*d*) That correct refraction and constant wearing of correcting glasses will in most cases of low myopia and myopic astigmatism, markedly improve vision and prevent an increase in the myopia, even though the eyes are under constant strain of close work.

In order to show more clearly the decided improvement in these cases, the average gain in feet is taken for the periods between the February examination, the reexamination in April, and the reexamination in August, and also the total average gain from February to August.

76 cases from February to April 25, R. 2.56 feet, L. 1.55 feet.
31 cases from February to April 25, R. 1.42 feet, L. .68 feet.
31 cases from April 25 to August 30, R. 2.77 feet, L. 3.39 feet.
31 cases from February to August 30, R. 4.19 feet, L. 4.07 feet.

Three midshipmen wore their glasses constantly from the time they were refracted until August 30 with the following resultant average gains.

3 cases from February to April 25, R. 2.25 feet, L. .37 feet.
3 cases from April 25 to August 30, R. 3.00 feet, L. 2.96 feet.
3 cases from February to August 30, R. 5.25 feet, L. 3.33 feet.

In the opinion of the writer, the fact that a greater number of these cases of lowered vision qualified in the vision test (96 per cent) this year than in previous years was due to their having worn their correction *constantly* and not just for study. It has not been customary to require midshipmen to wear their glasses except for study, until this year.

A detailed tabulation is appended showing the results in each individual case with the final action taken in each. The vision is recorded in feet, twenty being taken as normal. The initials R, L, B refer to right, left, and both, respectively.

No.	Vision February, 1921.			Date refracted.	Vision Apr. 25, 1921.			Disposition.	Reexamination Aug. 30, 1921.			
	R.	L.	B.		R.	L.	B.		R.	L.	B.	Disposition.
1	7	12	12	Mar. 18, 1921	8	14	16	Not qualified..	15	20	25	Qualified.
2	20	13	23	Mar. 3, 1921	15	15	21	Qualified.....				
3	20	8	25	Feb. 18, 1921	20	12	25	Not qualified..	20	15	25	Do.
4	10	10	15	Jan. 7, 1921	15	14	16	.....do.....	20	15	25	Do.
5	15	12	18	Mar. 4, 1921	15	15	18	Qualified.....				
6	10	12	15	Oct. 30, 1920	15	15	20	.....do.....				
7	18	11	20	Mar. 1, 1921	20	15	22	.....do.....				
8	10	20	25	Feb. 11, 1921	15	20	25	.....do.....				
9	15	12	16	Mar. 4, 1921	15	10	20	Not qualified..	20	17	25	Do.
10	10	15	18	Mar. 5, 1921	4	5	7	.....do.....				Resigned.
11	14	15	20	Mar. 16, 1921	13	14	19	.....do.....	15	15	20	Qualified.
12	10	15	15	Mar. 1, 1921	15	18	20	Qualified.....				
13	20	12	24	Mar. 5, 1921	20	12	25	Not qualified..	20	15	25	Do.
14	18	11	18	Feb. 23, 1921	15	13	20	.....do.....				Detached.
15	13	11	14	Mar. 5, 1921	15	12	15	.....do.....	15	15	17	Qualified.
16	20	14	25	.....do.....	20	15	25	Qualified.....				
17	12	17	17	.....do.....	15	12	16	Not qualified..				Resigned.
18	13	14	15	Feb. 5, 1921	15	15	16	Qualified.....				
19	15	10	15	Mar. 7, 1921	13	12	18	Not qualified..	15	15	20	Qualified.
20	13	18	20	Feb. 18, 1921	15	19	21	Qualified.....				
21	20	10	25	Mar. 7, 1921	20	11	25	Not qualified..	20	15	25	Do.
22	8	10	11	Mar. 1, 1921	15	15	20	Qualified.....				
23	5	9	9	Feb. 24, 1921	8	8	13	Not qualified..	17	15	18	Do.
24	4	16	16	Mar. 7, 1921	12	15	18	.....do.....	15	17	20	Do.
25	12	20	21	.....do.....	15	20	20	Qualified.....				
26	16	11	20	.....do.....	20	11	25	Not qualified..	20	17	25	Do.
27	12	16	18	Mar. 11, 1921	15	20	23	Qualified.....				
28	12	14	15	Mar. 7, 1921	14	15	16	Not qualified..	15	15	15	Do.
29	10	9	13	Mar. 8, 1921	6	6	8	.....do.....				
30	14	15	16	Feb. 15, 1921	15	17	19	Qualified.....				
31	15	8	20	Feb. 28, 1921	20	15	25	.....do.....				
32	8	8	8	Apr. 7, 1921	9	10	11	Not qualified..				Passed by bureau.
33	15	14	18	Mar. 8, 1921	15	13	18	.....do.....	16	15	20	Qualified.
34	15	10	15	Mar. 26, 1921	15	15	18	Qualified.....				
35	12	12	16	Mar. 8, 1921	15	15	19	.....do.....				
36	20	8	20	Feb. 24, 1921	20	9	23	Not qualified..	20	15	25	Do.
37	10	116	11	Mar. 30, 1921	10	8	12	.....do.....				
38	13	10	16	Mar. 3, 1921	15	13	17	.....do.....				Passed by bureau.
39	8	20	25	Mar. 8, 1921	12	20	25	.....do.....	15	20	20	Qualified.
40[1]												
41	10	12	17	Mar. 8, 1917	8	8	15	Not qualified..	20	15	25	Do.
42	12	14	15	.....do.....	15	15	20	Qualified.....				
43	12	15	15	Mar. 8, 1921	15	16	17	.....do.....				
44	9	14	18	.....do.....	10	15	16	Not qualified..	15	15	18	Do.
45	8	15	17	Feb. 25, 1921	15	15	17	Qualified.....				
46	9	15	18	Feb. 18, 1921	12	15	17	Not qualified..	18	20	25	Do.
47	11	14	21	Mar. 8, 1921	17	18	20	Qualified.....				
48	15	11	18	.....do.....	18	12	20	Not qualified..	20	15	25	Do.
49	12	10	13	Mar. 9, 1921	12	13	15	.....do.....	15	13	15	Rejected.
50	13	11	16	Dec. 4, 1920	19	16	20	Qualified.....				
51	14	16	22	Mar. 9, 1921	15	15	20	.....do.....				
52[1]												
53	20	14	25	Feb. 28, 1921	15	15	21	Qualified.....				
54	11	11	15	Mar. 9, 1921	18	18	21	.....do.....				
55	10	11	12	Mar. 11, 1921	13	12	15	Not qualified..	20	20	25	Qualified.
56	13	20	25	Mar. 9, 1921	16	18	23	Qualified.....				
57	20	10	20	Mar. 10, 1921	18	9	18	Not qualified..	20	15	25	Do.
58	6	6	10	.....do.....	11	8	11	.....do.....	15	15	20	Do.
59	16	13	15	.....	19	18	19	Qualified.....				
60	9	20	22	Feb. 28, 1921	16	20	25	.....do.....				
61	20	10	21	Mar. 3, 1921	18	13	20	Not qualified..	20	18	25	Do.
62	7	5	8	Mar. 19, 1921	15	15	18	Qualified.....				
63	12	16	17	Mar. 10, 1921	12	15	15	Not qualified..	15	18	25	Do.
64	11	15	17	Mar. 3, 1921	15	15	15	Qualified.....				
65	14	14	16	Feb. 12, 1921	11	13	15	Not qualified..				Resigned
66	7	20	25	Mar. 11, 1921	15	20	25	Qualified.....				
67	12	12	15	.....do.....	15	15	15	.....do.....				
68	11	16	17	.....do.....	18	19	23	.....do.....				
69	7	20	25	Mar. 10, 1921	12	20	25	Not qualified..				Rejected.
70	15	12	15	Oct. 16, 1921	15	12	16	.....do.....	15	10	16	Do.
71[1]												
72	10	20	21	Mar. 10, 1921	15	20	25	Not qualified..	15	20	25	Qualified.
73	13	15	17	.....do.....	16	16	20	Qualified.....				
74	10	12	15	Mar. 11, 1921	15	15	19	.....do.....				
75	10	15	16	Feb. 14, 1921	12	15	18	Not qualified..	16	18	25	Do.
76	14	20	25	Mar. 1, 1921	15	20	25	Qualified.....				
77	15	10	25	Mar. 23, 1921	20	12	25	Not qualified..	20	16	25	Do.
78	13	14	14	Feb. 11, 1921	9	14	16	.....do.....	15	15	25	Do.
79	14	13	17	Mar. 3, 1921	16	16	19	Qualified.....				

[1] No data obtainable; resigned.

RECURRENCE IN A CASE OF HYDATID DISEASE.

SYMPTOMS AND FINDINGS THREE YEARS AFTER INITIAL OPERATION.

By C. S. Norburn, Lieutenant, Medical Corps, United States Navy.

A patient 28 years of age entered the hospital January 8, 1921, complaining of nervousness and a tumor in the anterior abdominal wall.

He was born in southern Italy and lived there on a farm until 8 years of age, when he came to Philadelphia, where he worked as a mill hand and laborer until 1917. That year he enlisted in the Army and was sent to the Mexican border to work in a pack train.

Early in 1918 he had an attack of acute generalized abdominal pain. Laparotomy was performed. A communication sent to the surgeon to ascertain the exact findings received no reply; however, the patient states that his appendix was removed and a cyst of the liver was operated upon. He has never been real well since. While he has been up and about he has been weak, obstinately constipated, and often dizzy. He has a ravenous appetite but no gastric symptoms; has never had any attack simulating urticaria; no temperature, cough, or other symptoms. He states that the tumor has existed from a time shortly after the operation and has grown very little in size lately. Family medical history negative.

Physical examination showed a well-developed, well-nourished white male. Heart and lungs were normal. Nervous system negative except for fine tremor of fingers and tongue. No glandular enlargement. The abdomen showed no rigidity or tender areas. There was a high linear scar along the outer margin of the right rectus muscle, the site of the old incision, and two stab wounds in the right lower quadrant, which, according to the patient, had been used for drainage. A rather hard tumor, smooth in outline and about as large as a hen's egg, could be palpated in the abdominal wall behind the right rectus muscle just above the umbilical level and close to the mid line. No sense of fluctuation or hydatid fremitus could be made out. The spleen was enlarged, extending about two fingers below the costal margin. On deep pressure a mass could be made out below and behind the lower border of the spleen. Its outline was indistinct and it did not move on respiration.

X-ray of diaphragmatic line showed the left side to have a higher elevation than the right side.

Temperature, pulse, and respiration normal. Wasserman negative. Urine negative. Blood negative for malarial parasites. Blood count January 10, 1921: Red cells, 4,870,000; white, 8,800; polys., 63 per cent; small leucocytes, 32 per cent; large leucocytes, 0.3; large mononuclears, 1 per cent; eosonophiles, 1 per cent. On January 14 and 18

blood counts were made with practically the same results except that on these dates no eosonophiles were seen in a count of 200 white cells. No antigen being available, fixation tests for hydatid disease were not carried out.

On February 2 while at home on overnight liberty patient had a short convulsive seizure. He was brought to the hospital in an ambulance. He was extremely nervous, markedly swollen over abdomen and face. His tongue was thickened. The swelling did not resemble urticaria, but was rather a generalized edema; however, his feet and legs were not swollen. Physical examination showed nothing new. Malarial smear negative. Urine showed a heavy cloud of albumin and many granular casts. Leucocytes, 18,600; polys., 79 per cent; small leucocytes, 18 per cent; large leucocytes, 1 per cent; eosonophiles, 1 per cent. Temperature, 103; pulse, 78; respiration, 18.

February 3, 1921. Had a chill lasting one-half hour at 8 a. m., followed by profuse sweating; felt light headed and dizzy; no pain. Temperature, 100.2; pulse, 112. Respiration 28 even throughout the day. Urine showed faint trace of albumin. No casts. Puffiness had disappeared. Malarial smear negative.

February 7, 1921. Still nervous and has tingling in fingers. Temperature, pulse, and respiration normal since February 3. Leucocytes, 12,000. Practically no change in differential count.

February 16, 1921. All these symptoms have cleared up. Operation—A small incision was made over the tumor in the abdominal wall. It was found to be behind the posterior rectus sheath, bulging this structure forward. The tumor was tapped and very clear, colorless fluid drawn off. A small opening was made into it and the white friable endocyst easily lifted out. The whole wound was cleansed and swabbed with tincture of iodine. The floor of the cyst now protruded forward like a hernia. A small incision was made with the purpose of excising it; however, it was found that the intestines were bound tightly to the sac and to the abdominal wall by firm adhesions. The edge of the liver was seen. It was of a dirty reddish, yellow color. The opening into the abdomen was closed and the sac marsupialized. A second large incision was made on the left side, parallel with the infra-costal line and a thorough exploration made. The spleen was enlarged and bound to the surrounding structures by dense adhesions. A cyst holding about a quart was found overlying the inner anterior aspect of the left kidney, attached to the posterior abdominal wall and to the intestines. Numerous small cysts were attached to coils of bowels. One coil of small intestines with a cyst as large as a walnut springing from its wall was brought out of the wound and drained with a needle and the same clear fluid obtained. Scattered about on the peritoneal wall of the bowel could be seen raised yellowish white spots about one-half cm. in diameter. The

large cyst was drained and the wound closed. There were no daughter cysts.

Miscroscopic examination of endocyst showed the scolices of Echinococcus.

There was not post operative rise until the eleventh day when the temperature was up for two evenings after which its remained normal. The urine was clear of albumin and there were no symptoms.

The wounds healed rapidly, the small marsupialized one granulating up from the bottom. The patient left the hospital April 12, 1921. Condition about the same as when he entered.

This case presents a very interesting group of symptoms occurring in hydatid disease. It shows how low the eosonophile count may be. And, whether the dissemination of the disease in this case occurred from a rupture of the cyst at the time of his abdominal symptoms in January, 1918, or followed a soiling at the operation, it emphasizes again the very great importance of using, during operation, every precaution, to prevent the escape of the contents of an echinococcus cyst into the abdominal cavity.

A DIAGNOSTIC SIGN DIFFERENTIATING BETWEEN ERUPTIONS CAUSED BY COWPOX VACCINATION AND THOSE DUE TO SMALLPOX AND CHICKEN POX.

By P. R. Stalnaker, Commander, Medical Corps, United States Navy.

A diagnostic sign which differentiates eruptions caused by cowpox vaccination from those produced in smallpox and chicken pox is of the greatest importance, especially during a threatened epidemic, in arriving at a correct diagnosis in cases in which it is undecided whether the skin eruption on a patient is that of smallpox, chicken pox, or merely that following cowpox vaccination.

I have noted that when bodily eruption caused by cowpox vaccinations occurs, the eruption is never seen in the mucous membrane of the roof of the mouth (either the hard or the soft palate). If an eruption is present in the roof of the mouth it is certain not to be the result of cowpox vaccination. On the other hand, I have never seen a single case of either smallpox or chicken pox in the eruption stages in which an eruption was not present in the mucous membrane of the roof of the mouth.

As far as I am aware, after carefully reviewing the available literature, this differential diagnostic sign has not been brought to the attention of the medical profession, therefore, I take the opportunity of presenting it for what it is worth, as a personal observation covering thousands of cases of cowpox vaccination and scores

of cases of smallpox and chicken pox. I have never seen this sign fail and I have come to look upon it as an invariable rule and the most valuable single diagnostic sign differentiating vaccinia from smallpox or chicken pox.

REPORT OF THREE "HALLUX VALGUS" (BUNION) OPERATIONS, USING MAYO'S TECHNIQUE.

By A. H. Robnett, Commander, Medical Corps, United States Navy.

No. 1. Mrs. A. D., 35 years of age, had had painful and troublesome bunions since childhood; both feet were deformed and she had difficulty in getting properly fitting shoes. One-half hour before operation she was given morphine sulphate, grain $\frac{1}{4}$ and atropine sulphate, grain $\frac{1}{150}$ hypodermically. A local anesthetic, procaine 1 per cent, adrenalin chloride 5 drops to 1 fluid dram, was used. Right foot, the distal head of the internal metatarsal bone was removed, the bursa dissected out and sewed in place. She was kept off her feet one month, then allowed to walk. The left foot was operated on two months after the right, using the same technique. Convalescence was uneventful. Two months after the second operation the patient attended a ball and danced all evening without pain or discomfort of any kind. A local anesthetic was used in this case as she was an arrested tuberculous patient.

No. 2. Mrs. H. M., 32 years of age, had suffered for years from bunions on both feet. She had considerable deformity and difficulty in getting properly fitting shoes. Anesthetic, ether. Both feet were operated on, using Mayo's technique. Convalescence was uneventful. The patient was kept off her feet for four weeks; then she was allowed to walk. At the end of the second month she proudly told me that the day before she had hiked up and down Radio Hill, a distance of about 10 miles, with a 500-foot elevation, and suffered no inconvenience. Two weeks later she complained of tension on the extensor tendon of her great toe. This tendon showed evidence of not being long enough, so under local anesthesia I lengthened it about an inch. This very promptly healed; five months have passed, and patient is still enthusiastic about the result of her bunion operations.

No. 3. J. E., United States Navy, 56 years of age. Painful bunion on left foot, difficult to get a comfortably fitting shoe. Anesthetic, general, ether. Bunion operation, Mayo's technique. Convalescence uneventful. Walking in three weeks. Two months later wearing ordinary custom-made shoe, no discomfort or difficulty in walking.

The Mayo's bunion operation as used by me is as follows: A semicircular incision of the skin is made on the inner side of the joint

with convexity upward. The center of the incision should be at the junction of the inner and dorsal surfaces so that the scar shall be the least exposed to pressure. The skin flap should be dissected down to and exposing the bursa and capsule of the metatarsophalangeal joint, the skin being separated from this and retracted. A similar incision is made, making a bursal and capsular flap, denuding the head of the metatarsal bone, which is then disjointed, and, with Gigli saw, amputated, leaving the internal surface longer; then, the bursal and capsular flap is tucked between the ends of the bones and held in place with chromic gut sutures. The joint is closed with several sutures incorporating the fascia. A suture is placed through or around the extensor tendon and fastened to the lower fascia, so as to bring this tendon directly across the center of the joint. Then the skin is closed with interrupted silkworm sutures. A folded piece of gauze is put between the great and second toe to act as a splint to keep the toe in a straight line and a compress snugly placed over the site of the wound.

The successful results obtained in the above cases are gratifying, and these, with three other successful bunion operations I have performed in the past, lead me to feel that the "Bunion" operation done with Mayo's technique is almost certain of success. Those patients with bunions operated on during the War and later invalided from the Service were probably malingering or had not been given sufficient time to fully recover from the operation, or the disability was the result of faulty technique. In my experience the best result is obtained by keeping the patient off his feet for one month, massage and passive motion should be begun during the third week and kept up until all evidence of swelling is gone. A general anesthetic is preferable as the edema following the infiltration caused by a local anesthetic delays healing.

REPORTS.

THE HOSPITAL STANDARDIZATION PROGRAM OF THE AMERICAN COLLEGE OF SURGEONS.[1]

By R. C. Holcomb, Commander, Medical Corps, United States Navy.

The American College of Surgeons instituted a program of hospital standardization in 1913 which aimed to create conditions in the practice of medicine out of which every patient, however humble, may receive the highest service known to the profession. In 1917 a minimum standard of service to patients was proposed as follows:

1. That physicians and surgeons privileged to practice in the hospital be organized as a definite group or staff. Such organization has nothing to do with the question as to whether the hospital is "open" or "closed," nor need it affect the various existing types of staff organization. The word staff here is defined as a group of doctors who practice in the hospital inclusive of all groups, such as the "regular staff," the "visiting staff," and the "associate staff."

2. That membership upon the staff be restricted to physicians and surgeons who are (*a*) competent in their respective fields and (*b*) worthy in character and in matters of professional ethics; that in this latter connection the practice of the division of fees, under any guise whatever, be prohibited.

3. That the staff initiate and, with the approval of the governing board of the hospital, adopt rules, regulations, and policies governing the professional work of the hospital; that these rules, regulations, and policies specifically provide: (*a*) That staff meetings be held at least once a month. (In large hospitals the departments may choose to meet separately.) (*b*) That the staff review and analyze at regular intervals the clinical experience of the staff in the various departments of the hospital, such as medicine, surgery, and obstetrics; the clinical records of patients, free and pay, to be the basis for such review and analyses.

4. That accurate and complete case records be written for all patients and filed in an accessible manner in the hospital, a complete case record being one, except in an emergency, which includes the personal history; the physical examination, with clinical, pathological,

[1] Report of the Conference on Hospital Standardization which was convened at the Bellevue-Stratford Hotel, Philadelphia, October 24, 1921, in conjunction with the annual meeting of the American College of Surgeons.

and X-ray findings when indicated; the working diagnosis; the treatment, medical and surgical; the medical progress; the condition on discharge with final diagnosis; and, in case of death, the autopsy findings, when available.

5. That clinical laboratory facilities be available for the study, diagnosis, and treatment of patients, these facilities to include at least chemical, bacteriological, serological, histological, radiographic, and fluoroscopic service in charge of trained technicians.

The above minimum standard has been indorsed by various organizations, such as the American Hospital Association, the Canadian Medical Association, the Catholic Hospital Association, the Conference Board of Hospitals and Homes of the Methodist Church, the Medical and Surgical Section of the American Railway Association, the Methodist Hospital Association, the Protestant Hospital Association, and numerous State, provincial, and local organizations.

According to a report made at the conference in 1918 of the general hospitals of 100 beds in the United States and Canada, 89 met the standard. In 1919, 198 fulfilled the requirements; in 1920, 407, or 57 per cent, met the standard; and this year 568, or 74 per cent of the 761 general hospitals, are on the approved list.

The college publishes a list [2] of approved hospitals of capacity of 100 beds and over. In this list which is arranged by States and Provinces (Canadian) a certain number are designated with an asterisk. This group includes those hospitals which, when visited, had adopted the fundamental principles of the minimum standard, but which at that time had not had sufficient opportunity to develop fullest approval.

The conference opened at 9.30 a. m. with Dr. George E. Armstrong of Montreal in the chair. The attendance at the conference was largely in excess of the seating capacity of the room in which it was held.

The following is an epitome of the remarks of some of the speakers:

Franklin H. Martin, M. D., secretary general, American College of Surgeons, pointed out the growing tendency toward cooperative diagnosis and treatment in handling the sick. "Medicine," he said, "is becoming more wholesale and institutional and less retail and domiciliary. That of necessity has placed an enormous responsibility upon the hospital, because the hospital must be the institution in which the wholesale or group medicine is practiced." He spoke of the interest the College of Surgeons had in establishing the standard of the hospitals in which the fellows of the college or candidates for fellowship did their work. In furnishing reports of the 50 major and 50 minor operations, a requirement for admission to fellowship reports were submitted on such a variety of forms the

[2] Bulletin American College of Surgeons, January, 1921.

college felt the necessity for establishing some standard system of records based on an accepted minimum standard of what should constitute efficient hospital practice. A committee was formed to standardize the case records. "This," he said, "was really the first step in the standardization of hospitals." He then spoke of the minimum standard outlined above, and of the survey which is still being conducted, and of the plans to include a survey of the 50 bed hospitals in 1922. In closing his remarks he returned to the subject of the interest of the College of Surgeons in this survey because it is the measure the college has of the fitness of the men who apply for entrance to the College.

Dr. Robert L. Dickinson, of New York, advocated the program of standardization from the viewpoint of the medical profession. He believes that a system of surgical accounting may be devised which will show end results and that a surgical accounting is as necessary as any other method of accounting. He also spoke of the danger of placing too much importance on the mortality list of an institution. "If I were injured in the street," he said, "and taken to a hospital suffering from internal hemorrhage, I would not want the doctor to hestitate to open my abdomen, because he must keep one eye on the mortality list for fear of adding another death to it. We must have fearless surgery. On the other hand, the reckless experimentor with human life must be curbed." He also spoke of the necessity of making a careful study of hospital infections.

Dr. Frederick W. Slobe, M. D., of the American College of Surgeons, spoke of the hospital survey of 1921. He explained how this was conducted through personal visits of a corps of seven surveyors. "These men, all physicians, were from medical schools and hospitals of widely separated sections of the country. They were given a course at the college under experienced visitors so that they obtained uniformity in their training. Therefore, whether the hospital visited was in California or Maine, they were all visited on the same basis. By visiting a large number of hospitals, the surveyors obtained a general rather than a local viewpoint. This policy of personal visits by a corps of well-trained hospital surveyors was one of the essential elements of the college program. Difficulties were experienced in their endeavor to meet the standard of the college. Relative to standardized organizations, one of the difficulties seems to be the adoption of staff meetings. Staff meetings are, of course, essential in the average hospital. Hand in hand with the development of staff meetings has been an increased interest by the administrative board in the professional work of the hospital. This has been a large factor in the adoption of rules and regulations guiding personal work. When board members are presented each month with medical audits they gradually become more interested in the clinical work of the hospital.

"In our survey we found case records were improving steadily, although they still constitute the greatest difficulty in some hospitals. Two factors are most prominent: First, the lack of proper interest by the physicians and hospital executives themselves in the case records; second, the lack of internes. The hospital should supply adequate record clerks, record material, etc.

"Laboratories have shown a similar improvement. There is a demand for laboratory equipment, technicians, and pathologists which hitherto has been unknown. The great handicap in laboratory service is the system prevailing of making a charge for all laboratory work performed. A flat rate or fee may not be applicable in all hospitals but it has been helpful in many hospitals in solving the laboratory problems.

"Last year out of 697 hospitals in the United States and Canada having a capacity of more than 100 beds, 407, or 57 per cent, were on the approved list. This year the total number of 100-bed hospitals has grown to 761, or 74 per cent, now on the approved list. Of this number only 18 per cent are listed with an asterisk, showing a great relative decrease in the number of hospitals that were listed with the asterisk. The total number of hospitals visited this year has been 1017.

"The minimum standard is not destined to be the resting point."

Rev. Charles B. Moulinier, S. J., president of the Catholic Hospital Association, spoke of the standardization program of the American College of Surgeons. He spoke briefly of the historical basis of the movement, the scientific thought that underlies it, and its bearing on religious thought, feeling, and spirit. He said in part: "Some five years ago the American College of Surgeons, stirred down into the depths of its soul, began to realize that it had a mission for better care of the sick in the United States and Canada and made up its mind, as you all know, to improve surgery. Everybody knows that you can not improve surgery unless you improve everything that centers in the work of the hospital. So the American College of Surgeons had not gone far in its work of improving surgery without realizing it had to improve everything in medicine. The college in its fine spirit of honor said: 'That's what *we* want to do. What are *you* going to do?' They were told to go on and do their work and we would stand by and help them. Take it to your hearts that you have helped to improve the whole medical profession. I know this from personal experience in the movement. The college is only at the beginning of its work, but it can carry it on to the end because it is the only body of people, as far as I know, that are capable of finishing a movement, at least up to the point where it is safe, sound, and sure.

"Scientifically it seems to me this should be said. The mind of the medical profession is being reached as it was never reached before,

to make it more keen, more analytical, more cautious, more cooperative in its scientific combination of thought, in its analysis of assembled facts, and in its care and gradual step-by-step arrival at a diagnosis. This all grows out of the organized staff and out of monthly staff meetings and weekly meetings. It has been brought about that the medical profession working in the hospital has come to the conclusion that minds must get together and that facts must be assembled. In other words, the medical mind all over the country is being convinced by this program that the time for independent spirit and hostile thinking has passed in medicine. To-day everybody is convinced that no medical thought is final, safe for the patient or the public until several minds have concurred. We all know how difficult it is to get at the truth in a complicated condition in the human system and how liable the best are to err. This movement is making the people realize that the patient comes first and that no man, no matter how able, how well instructed, or how experienced he is has the right to assume his own mind is final, and hence, what are we getting? Assembled minds and thought. The patient getting more and more what he has the right to expect from the medical profession in our hospitals."

Alfred K. Haywood, M. D., superintendent of the Montreal General Hospital, Montreal, spoke of the movement from the viewpoint of the hospital superintendent.

He said in part as follows: "The modern hospital administration has changed. I am quite sure that the majority here present can remember when in your community you had a hospital superintendent or hospital superintendents who were practitioners who had failed in private practice or who had influence with the committee of managers and who took up the business of hospital administration in order to dig up a living with the least amount of effort. I know there have been just such administrators. To-day it is a scientific business and those who have hospital administration at heart realize we are only at the beginning. Our hospitals stand for two purposes. They teach and they heal. It is not possible in every community to have a teaching hospital but every hospital can be a healing hospital. A great many things have been brought out by hospital standardization. Hospital standardization, however, has not always met with approval. A better name has been sought for it, but failing to find it the term has remained. In my opinion it stands for hospital betterment. If we are going to take our place in the community, we have got to be in a position to give the results of our work in black and white, and that we are making honest endeavor, financial and otherwise; that we are endeavoring to treat our patients with the most modern facilities we have at our disposal. Hospital standardization

gives us the opportunity of securing facilities for treatment and diagnosis that we could not otherwise get. It is, at the same time, an increased expense on the hospital administration. There was a time when we were content with written reports of operations. Now we must have typewritten reports, which means extra stenographers, extra equipment, etc., but I can assure you that in putting in the required percentage of hospital standardization, while it has made increased expenditures, has given us 50 per cent increase in results."

Dr. Newton E. Davis, executive secretary Conference Board of Hospitals and Homes of the Methodist Church, spoke of hospital standardization from the viewpoint of the hospital trustees. He pointed out that there were four types of hospitals as far as the controlling board is concerned. (1) Private hospitals, usually run by physicians who have a large part in the hospital administration; (2) hospitals under State control and run by State administrators; (3) memorial hospitals having boards of trustees made up of persons appointed by those endowing the hospital in memoriam, and (4) church hospitals administered by the church. He spoke of the endorsement by the conference board of the program of hospital standardization. Additional clerical force for record making represented an expense which has to be met.

He pointed out that if the surgeons were to be held to a responsibility for their work, the board of trustees must be held to a responsibility to furnish the money to meet increased and more elaborate requirements.

John M. Baldy, M. D., of Philadelphia, spoke of the relationship of hospital standardization to laboratory service. He believes that a hospital has no better claim to progress and to the competence of its staff than is brought about through the laboratory. "Every month we expect laid on our table a detailed report of the work done in the laboratory. In addition, we see opposite the name of every man on the medical and surgical staff what he has asked of the laboratory.

"The laboratorian must keep his records and study his cases keenly. He is in a position to discuss things with the pathologist. The prime duty of the pathologist is to jack up the medical men. So it is that the pathologist in an institution comes to realize that he must have tact so that he can coordinate with the consulting physician and will be asked to the bedside of the patient to study the case with the physician. In other words he is not a technician but a consultant. The pathologist is a consultant to every man on the medical and surgical staff."

He pointed out that the upkeep of the laboratory cost money and that the staff should appreciate and use the laboratory.

Dr. Daniel Z. Dunott, of the medical and surgical section of the American Railway Association spoke of what the railroads were do-

ing in connection with the program of standardization. He said, in part:

"In the last 10 years the railroads have injured practically 1,700,000 men and we have killed accidentally about 100,000. The committee discussing these questions drew up rules and regulations for the care of the injured. One decision was that their patients would be treated only in hospitals meeting with the standardization of the American College of Surgeons. Our cases are of a necessity emergency cases and we may have to put patients in hospitals not meeting the standardization, but we move these patients just as soon as it is consistently possible to do so. In a number of instances the transportation of men seriously injured to a greater distance would have given them a better opportunity than putting them immediately into a hospital not meeting the standard.

"We have 13,000 doctors who are acting in the capacity of surgeons of the railroads and we have about 275 who are heads of surgical staffs. I can not definitely say how many hospitals aggregately are used by the association, but I know that the Baltimore & Ohio uses about 310 hospitals, the Pennsylvania Railroad uses 277, and the Union Pacific, a railroad of 9,000 miles, uses about 123. The Union Pacific has 20 hospitals under its own control. About 30 of these are of 25 beds or under. I should say, all in all, the railroads of the United States use about four-fifths of the hospitals in the country."

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander C. W. O. Bunker, Medical Corps, United States Navy.
Lieutenant Commander Lucius W. Johnson, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.
Lieutenant Commander J. J. O'Malley, Medical Corps, United States Navy.
Lieutenant Commander L. H. Clerf, Medical Corps, United States Navy.
Lieutenant L. W. Shaffer, Medical Corps, United States Navy.
Lieutenant J. J. Sale, Medical Corps, United States Navy.
Lieutenant E. Peterson, Medical Corps, United States Navy.

GENERAL MEDICINE.

Christian, H. A. **Chronic myocarditis and its management.** South. Med. Jour., August, 1921.

Chronic myocarditis is primarily a disturbance of the heart muscle resulting in cardiac insufficiency. The term is not used in the sense of a chronic inflammatory change in the myocardium but in a functional sense to connote a heart muscle unable to function normally. Under the microscope we may not be able to detect any changes in the muscle fibers or interstitial tissues in all cases, but a certain percentage will show some areas of degeneration.

Chronic myocarditis is a very common condition and occurs more frequently than any other cardiac condition in persons above 40 years of age. It is frequently diagnosed as mitral insufficiency and considerable confusion has resulted thereby. In mitral insufficiency, we have a diseased condition of the mitral leaflets and the leak is directly attributable to the changes in the valve. In chronic myocarditis the weakened heart muscle has allowed the valve orifice to dilate and a regurgitant murmur is the result.

The condition is diagnosed by the evidences of a weakened circulation apart from the heart as shown in various portions of the body both by symptoms and physical signs. Of these two, with the exception of edema, symptoms are by far the most important. The symptoms are just those you get when the normal heart is made to do much work: breathlessness, rapid pulse, precordial distress, only with chronic myocarditis they are produced by very little exertion or come on spontaneously. With these generally go an enlargement of the heart and usually a mitral systolic murmur.

In almost all of the patients of this group cardiac symptoms have developed after 40 and a history of true rheumatism is lacking. Except for a syphilitic aortitis causing aortic insufficiency practically all cardiac murmurs in those with cardiac symptoms developing after 40 arise from myocardial not from valvular changes; in other words, they indicate chronic myocarditis as here defined.

The treatment of this condition as a rule is very satisfactory, many of these patients have auricular fibrillation where digitalis gives its most brilliant results. Rest, digitalis, and diuretics are the three main reliances.

Rest must be real and maintained; the patient comfortably placed in bed with eating, bowel movements, and bathing all reduced to the lowest possible minimum of exertion. Mental rest is also essential. Morphine frequently is of inestimable value in attaining rest, particularly during the first nights of the treatment.

Digitalis in this group of cases is capable of accomplishing wonders up to the time the heart muscle becomes unable to respond further. Know the results you should get and give sufficient of the drug to produce these results. The dosage will depend on the potency of the drug used, and it is immaterial whether you follow the method of one or two large doses, or follow the usual way of repeated small doses, the end results of both are the same. The former brings quicker comfort to the patient, but the latter is safer if your patient is not under close observation.

Digitalis in adequate dosage should produce slowing of the pulse with decrease of the pulse deficit in cases of fibrillation, diureses when edema is present and decrease in dyspnea, nausea, and vomiting. One or the other of these changes may appear first. The appearance of any one is a sign for decreased dosage, the absence of all is evidence of insufficient dosage. The corollary to these statements is to give digitalis until you get one of these effects. In my experience the failure to give enough digitalis is a common error among physicians; to give too much is a rare mistake.

Finally, for the water-logged cardiac, a diuretic causes prompt diuresis. The best results are obtained with theophyllin and almost as good with theobromin sodiosalicylate. The best way to use them is to give them after two days of digitalis therapy in two doses, one early in the morning and the other at noon time; of theophyllin 0.2 gram or 3 grains, or of theobromin sodiosalicylate 0.5 gram or 7½ grains, and repeat this dosage on the third day if necessary. In this way frequently a tremendous diuresis is started and the patient rapidly loses his edema. As much as 60 pounds of water has been lost in 10 days as the result of this way of treating a water-logged cardiac. Whether or not you get a diuresis depends in a large part on the functional integrity of the kidney. If the edema is, in the

main, cardiac in origin, the diuresis occurs; if it is mainly renal in origin, no diuresis results. It is inadvisable to give diuretics continuously; better results follow intermittent dosage. (J. J. O'M.)

BASSETT-SMITH, P. W. **Further experiments on the preservation of lemon juice and prevention of scurvy.** The Lancet, August 13, 1921.

The subject of scurvy is of particular interest to all who have to maintain the health and well-being of sailors. Surgeon Rear Admiral P. W. Bassett-Smith, R. N., began some experiments on the preservation of lemon juice and the prevention of scurvy in 1919 and published his observations in the Lancet of May 22, 1920.

It is now known that lemon juice is far more effective than lime juice as it is now made in preventing scurvy and in curing the disease which is caused by a deficiency in a certain accessory factor in the diet, known as scurvy vitamine. This factor is found in living vegetable tissue, in largest amount in fresh fruit and in green vegetables, and, to a less extent, in roots and tubers. Young vegetables contain more than old. It is present in small amount in fresh meat and milk and exists to a certain extent in canned tomatoes. The antiscurvy vitamine is sensitive to high temperatures and if exposed to them rapidly loses its efficacy; the presence of alkali is also detrimental.

Much has been written of the prevalence of scurvy during and since the war among the combatant forces and in civilian populations in war areas, and the etiology has now been placed on a sure foundation.

Recognizing the fact that the antiscorbutic vitamine has been destroyed in the preserved lime juice from the West Indies as it is now made, the writer has endeavored to produce an efficient, portable, and palatable substitute for the use of ships as occasion requires.

Experiments with lemon juice have been made using guinea pigs which are extremely susceptible to scurvy. Various methods of preparing the juice were tried and the final laboratory method evolved is as follows:

"The juice of fresh lemons is roughly filtered through muslin and then through filter paper under reduced pressure by means of a water pump. The filtered juice is evaporated, in vacuo over sulphuric acid at ordinary temperature (13.5°–15.5° C.). The residue of non-crystallisable syrup is worked up into as stiff a paste as possible with mixture of anhydrous lactose 97 per cent, gum tragacanth 3 per cent. The paste is cut up into sections, each containing the juice of half a lemon. These are rolled, faced with the mixture, and pressed to assume the lozenge form. These tablets have been stored at 15°,

30°, and 37° C. for months, and have been employed in the experiments. The average yield of juice from one lemon is about 48 c.cm., and each tablet contains the equivalent of 24 c.cm. of unfiltered juice. The whole process takes about five days; no heat whatever is used."

When fresh, these tablets were remarkably efficient in preventing scurvy in guinea pigs fed on a diet deficient in the antiscorbutic vitamine.

As the time element is generally recognized as being one of great importance in reducing the antiscorbutic value of most preparations, the tablets were tested after storage at room temperature for over a year. The basal diet fed to guinea pigs weighing 300 grams, consisted of ship's biscuit, bran, oats, casein, salt, and lime water, with 60 c. c. daily of milk so heated as to destroy any antiscorbutic vitamine. Each day one-fifth of a tablet was given, equivalent to 4 c. c. of fresh lemon juice. The animals showed no signs of scurvy through a period of 70 days. Control animals without antiscorbutic factors showed signs of scurvy in 21 days, then rapidly lost weight.

Experiments were also made with tinned tomatoes. The guinea pigs were placed on the usual basal diet, and to this was added daily 4 c. c. of tinned tomatoes. When it was used as a prophylactic the animals steadily gained weight; in others, which had been allowed to develop definite scurvy symptoms with marked wasting, it rapidly established a dimunition of the symptoms and a steady gain in weight, thus corroborating the findings of Given, McClugage, and Hess in the United States. (W. M. K.)

Macklin, A. H. and Hussey, L. D. A. **Scurvy: A system of prevention for a polar expedition based on present-day knowledge.** The Lancet, August 13, 1921.

Scurvy has played a very prominent part in the history of Polar exploration, and a close examination of records shows that its presence or absence has borne a close relationship to success and failure. In the light of recent knowledge it is probable that many of the tragedies which have occurred were due to scurvy though the condition was not recognized or reported as such at the time. It may easily be understood that in the preparation for a modern expedition the prevention of scurvy is a most important consideration.

In 1913–14, when the expedition conducted by Sir E. Shackleton was in process of preparation, a reliable system of prevention was particularly difficult to form, for lime juice had been shown to be of doubtful value, and the "vitamine theory," though established, was still in its infancy, and of the factors influencing the vitamine comparatively little was known. It had not been shown that the Mediterranean lemon possessed a much greater antiscorbutic value than West Indian lime juice; the failure of lime juice was attributed to

the high temperature used in its concentration. Nevertheless, Shackleton, who fully realized the importance of strong antiscurvy measures, and who had made himself fully cognizant of the state of knowledge at that time, took every possible step to secure them, relying not on any one preparation, but providing a well-balanced dietary. The system adopted lay in the provision on the ship of good food, supplied in great variety and in ample quantity, great care being taken to see that it was served cleanly and in as attractive a manner as conditions permitted. For sledge journeys a preparation of lime juice was made in the concentration of which low degrees of heat were used and the product was put up in air-tight capsules. In the light of more recent knowledge this preparation was probably not rich in active vitamine, but its efficacy was never tested, for no extended sledge journeys were carried out until after the loss of the *Endurance*. Then for 10½ months the party lived on a severely restricted and monotonous dietary, but it was composed largely of fresh meat, hence, the men were remarkably free of any signs of scurvy.

Between that time and the present a great deal of work has been done and great advances have been made along the lines of clinical investigation and direct experiments on animals.

Investigations by Chick, Hume, and Skelton, and A. H. Smith have displaced lime juice from its time-honored position as an antiscorbutic, but have shown that lemon juice is very rich in active vitamine and has in the fresh state a high antiscorbutic value. When the fresh juice is evaporated in a vacuum over sulphuric acid, the efficacy is retained, as shown by Bassett-Smith, and a viscid sirupy mass is left which may be preserved by the addition of 10 per cent of alcohol—which also prevents freezing—or by making it into tablets. The amount estimated as necessary per man per day for prophylaxis is the equivalent of half a lemon in the fresh state.

The same investigators have shown that milk in the fresh state has a comparatively low antiscorbutic value which varies according to whether the cows from which it was obtained were fed on fresh greenstuffs or not. Milk powder, however, may be comparatively rich in vitamines, but this depends largely on the manufacturing process to which it has been subjected. The "spray" process of drying milk has been shown to be very detrimental to the antiscorbutic vitamine, but the "roller" process is much less so. In this process the milk is poured in its fresh state onto two revolving drums, heated to a temperature of over 100° C., on which it forms a film, and is scraped off within a few seconds by a knife-edge into a container.

Most fresh vegetables are richly antiscorbutic, but dried vegetables have been shown to be almost totally devoid of active vitamine. Vege-

tables preserved in tins by the process of canning are also of little value. A notable exception is canned tomatoes, which are strongly antiscorbutic.

Germinating pulses and cereals have been found to contain active vitamine.

Preserved meats may be regarded as having no antiscorbutic value at all. Fresh meat is able both to prevent and to cure scurvy, provided enough of it be eaten.

The antiscurvy or water-soluble C vitamine has been shown to be more sensitive to destructive influences than either the fat-soluble A or water-soluble B vitamines. The influences most detrimental to its activity are heat, drying, exposure to air (oxidation), aging, and an alkaline reaction.

The pathogenesis of scurvy is still incomplete, but it has been shown that there is a definite prescorbutic stage, characterized by a general depressed vitality, which persists for a varying period before the second stage, the stage of toxemia, sets in, producing the symptoms more usually considered as characteristic of scurvy. The symptoms of the first stage are a feeling of unusual lassitude, dyspnœa on exertion, tachycardia, frequent headache, and vague bodily pains. There may be disturbances of the gastro-intestinal tract. This stage may persist for a considerable period before more marked symptoms arise.

The toxemia of the second stage, which is accompanied by severe metabolic disturbance, is of gastro-intestinal origin. Robert McCarrison, in his "Studies in Deficiency Disease," states that the health of the gastro-intestinal tract is dependent on an adequate supply of accessory food factors, especially vitamines B and C. The disorder of the intestinal tract is enhanced when the deficient food is ill-balanced.

There are certain factors bearing on the incidence of scurvy in Polar expeditions. Life on the ship, or at a well-stocked base, permits of a full and varied diet. The conditions on a sledge journey are not so good, and as far as the danger of scurvy is concerned, vary considerably in the methods adopted. As long as "game" is plentiful there will be a great freedom from scurvy. But in the gameless areas, where rapidity of travel is essential, all food must be carried, and it must of necessity be light, and to meet the large expenditure of body energy each ration must have a high calorific value. To obtain the necessary lightness, all excess of moisture must be driven off, and the manufacturing processes necessary are such that at present no reliance can be placed on them for the supply of antiscorbutic vitamines and the deficiency of vitamine in the sledging ration must be made up by the addition of foods containing sufficient active vitamine to maintain health.

A system for the prevention of scurvy falls naturally under three main headings:

(1) The elimination of predisposing factors such as cold, fatigue, mental depression, short rations, and individual idiosyncrasy; (2) the supply of active antiscorbutic vitamines in sufficient quantity; (3) careful treatment of the bowel in the prescorbutic stage, and the elimination of extraneous toxins from the gastro-intestinal tract.

The most important part of the system depends upon the correct balancing of the dietary and in the selection of foods calculated to contain the active vitamines in sufficient quantity. In carrying this out it is necessary not only to select the foods, but to insure the packing so that at the time of consumption the vitamine shall not have been impaired by age or exposure. The main principles involved in attaining this are: (1) Quick packing immediately after preparation, avoiding undue exposure to air; (2) rigid exclusion of the products from the air by using hermetically sealed containers; and (3) the storage of cases containing antiscorbutic foods in a cool place, avoiding proximity to engines or boilers.

Reliance has been placed on the following antiscorbutic foods:

On board ship.—Lemon juice concentrated by the method advocated byAdmiral Bassett-Smith, but not made into tablets, the concentrated juice being treated by the addition of 10 per cent alcohol to prevent its freezing; dried milk prepared by the "roller" process; fresh meat whenever obtainable, and canned tomatoes. As regards germinated pulses and cereals, peas, beans, and lentils should be carried, and in the event of signs of incipient scurvy appearing, should be used after having been made to germinate.

On sledging expeditions.—Lemon juice tablets, as advocated by Admiral Bassett-Smith, packed in air-tight containers, and dried milk, as above, packed in small air-tight packages, each package containing only one day's ration, thus avoiding undue exposure to air.

A representative modern daily sledging ration is composed as follows: Pemmican, nut food, biscuit, tea, sugar, dried milk, amounting to a total weight of about 2½ pounds per man per day, and having a food value of about 5,000 calories. None of these foods can be relied upon to prevent the onset of scurvy; hence a reliable antiscorbutic preparation must be carried. (W. M. K.)

Levy, P. P. **Venous puncture by means of steel needles.** Press Méd. Paris, Sept. 28, 1921.

For properly puncturing a vein a sharp, sterile needle is required. Platinum needles are easily sterilized, but considerable pressure is needed to make them penetrate. Pressure causes pain. On the other hand, steel needles have sharp points and being inexpensive can be

used freely, and a considerable number be kept on hand, ready—sterilized. The objection to steel needles is that they oxidize rapidly, becoming useless. This can be avoided by the following technique:

Immerse the steel needles in paraffined chloroform.

Paraffine	3 gm.
Chloroform	100 c. c.

The ordinary laboratory paraffine answers the purpose. It is cut into shavings, which are then dissolved in commercial or anesthesia chloroform. In winter, solution is hastened by use of incubator at 37 C.

Take a new, clean needle, withdraw the obturator and place it point down in a sterile hemolysis tube. Pour in chloroform and paraffine to cover. Stopper the tube with cork. If an old, soiled needle is used, force water through it with a syringe, then 95 per cent alcohol and finally chloroform. It is next placed in the paraffine solution for one hour and may then be considered sterile. No deterioration results from remaining in the solution indefinitely.

Before using, remove the needle with sterile forceps, taking care not to let it touch the sides of the tube. Put it, point down, in a small sterile test tube stoppered with absorbent cotton. Turn the test tube upside down. The excess of chloroform runs out of the needle upon the cotton. Now the test tube, right side up, is incubated at 37 C, which hastens evaporation. Two hours suffice. In the absence of an incubator, room temperature will do.

The advantages of the method are: Absolute sterilization without oxidation of the needle; ease of sterilization; avoidance of the use of boiling water with oxidation of metal and laking of the blood. Again, a minute amount of paraffine remains as a coating for the inner walls of the needle, which prevents adhesion and coagulation of the blood. Needles of very small caliber (seven-tenths to eight-tenths of a millimeter diameter) may be used, which is impossible by other methods. The ideal needle is 2 or 3 centimeters long and eight-tenths of a millimeter inside diameter. The puncture with such a needle is practically painless—a desirable feature in the case of women and children. (The reviewer would say *men* and children.) (J. S. T.)

Ray, M. R. **The Wassermann Reaction: Reasons for discrepancies in estimation of clinical value: Necessity for uniformity and standardization: Suggestions: Report of a series and interpretation.** Amer. Jour. of Syphilis. April, 1921.

In spite of the multitude of modifications and newer methods for the serodiagnosis of syphilis, including the phenomenon of

Vernes recently revived by Cornwall and Aronson, the classical Wassermann reaction, or a technic which departs from it only in minor details, stands to-day as the only reliable laboratory test for syphilis.

The reasons for the growing lack of confidence in the Wassermann reaction on the part of clinicians are presented, together with a discussion of the causes for discrepancies in estimation of clinical value.

Attention is called to some of the pitfalls of the reaction and the observation of the clinician is directed to the features of the reaction which he ought to know, in order to be able to more properly interpret serological findings. Thus, the clinician would be in a position, as he has a right to be, to demand from the serologist not merely a report of positive or negative but a report of the antigens used in the test with the methods of fixation and himself interpret the serological findings on a basis of clinical manifestations.

The great need for standardization with the benefits to be derived therefrom is called attention to, and some suggestions are offered to bring about uniformity.

A series of 580 reactions performed with crude and cholesterinized extract, each with two methods of fixation, namely, the one-hour incubator and four-hour ice box methods, is analyzed with the following conclusions:

1. A positive reaction with cholesterinized antigen alone should be given no specific significance in untreated cases presenting no clinical manifestations of lues and giving a negative history.

2. The four-hour ice box method of fixation, while increasing the sensitivity of the cholesterin antigen as compared with the one-hour fixation in the water bath, magnifies the nonspecificity, except in treated cases, congenital syphilis and in some cases of neurosyphilis, where it has a decided advantage. On the other hand, with the crude extract the four-hour ice box method of fixation while increasing its sensitivity does not impair but rather augments the specificity.

3. The cholesterinized antigens possess a specific sensitivity exceeding that of the crude in all cases of syphilis under treatment, congenital syphilis and in some cases of neurosyphilis.

The great value and importance of lumbar puncture in all cases of syphilis is emphasized. A spinal fluid examination, including cell count, globulin estimation, colloidal gold, and Wassermann reactions is imperative before a prognosis in any case can be given, in spite of the fact that treatment has produced a Wassermann negative blood. (L. W. S.)

SURGERY.

Ross, J. N. MacB. **First-aid work on shore with the Royal Naval Division.**[1]

Jour. Roy. Nav. Med. Serv. October, 1921.

Continuing his discussion of first-aid work ashore, the writer considers shock, wounds of blood vessels and hemorrhage, fractures, abdominal wounds, chest wounds, head injuries, and gas poisoning.

SHOCK.

Shock is one of the most important complications of war wounds, and there are certain predisposing factors which render one man more liable to shock than another, and which must be considered in formulating a method of preventing and treating the condition.

Temperament, the high nervous tension both before and during an attack, has an important bearing upon the degree of shock a man experiences when wounded, as has cold, fatigue, hunger, pain, and the nature of the wound.

The amount of shock experienced is directly proportionate to the severity of its predisposing causes. In an attack or intense bombardment a man is generally cold, tired and hungry; everything favors the onset of shock if he be wounded.

Such a man, for example, receives a large lacerated wound, say, of the left leg—the writer describes the clinical features of the case as follows:

"He staggers on a few paces and then falls heavily to the ground. His first thought is one of mingled surprise and anger at being hit; his second one of fear that his medical officer may not find him, and his third one of resignation to certain death. Some half an hour later the medical officer comes across him. His face is pale, drawn, and somewhat haggard; his eyes half closed, momentarily light up with a look of welcome, but later show that intense anguish of which his lips so seldom complain. He is quite conscious and, though answering questions intelligently, rarely of his own accord volunteers any information. He is bathed in a cold perspiration, his pulse-rate is increased, but his respirations are fairly normal. He shivers with cold, and his only complaint is the intense cold which he experiences. His condition is said to be one of primary wound shock.

"The battalion medical officer applies a first field dressing, collects a stretcher party, superintends the movement of the patient on to the stretcher, covers him with a blanket, if one is available, and the weary, difficult, dangerous journey back to the Regimental Aid Post commences, during which the man becomes still more cold.

[1] The first portion of Surgeon Lieutenant Ross's paper on first-aid work ashore was reviewed in the January number of the U. S. Naval Medical Bulletin.

"On arrival at the regimental aid post his blood pressure, which formerly seemed rather higher than normal, is now subnormal, and his pulse is still further increased in frequency.

"The wound is here thoroughly dressed, and warmth is applied both internally and externally. He is then sent back by stretcher to the advanced dressing station of the field ambulance, a journey which may take two to eight hours. Here his condition is found to have become progressively worse. His body temperature is exceedingly low, his pulse is rapid and feeble, his blood pressure has dropped still further, and his fingers and toes, especially under the nails, have assumed a bluish coloration. He is said to be passing into a condition of secondary wound shock.

"From the advanced dressing station, unless his wound requires immediate attention, he is at once sent, now well wrapped up in blankets, by motor ambulance, to the main dressing station of the field ambulance, and thence to the nearest casualty clearing station—all the time his condition becoming steadily worse.

"On arrival at the casualty clearing station he is markedly apathetic and complains only of cold and intense thirst. His respiration are now somewhat embarrassed, and he is in danger of cardiac failure. Secondary wound shock is said to be now fully developed.

"Having at last reached a stationary hospital, his further condition does not concern the forward medical officer, but it must be remembered that during the tedious and difficult journey he has certainly been suffering from a progressive oozing of blood, and probably sepsis is gradually developing. These two factors definitely tend to increase his condition of shock."

Early treatment is essential to success and is mainly directed toward combating the various predisposing factors which have been mentioned. When a wounded man reaches the regimental aid post, his stretcher should be rested upon two tressels and an oil stove or primus lamp placed underneath it. He should be well wrapped in blankets, and hot water bottles applied to his feet and body. Do not disturb his clothing unless necessary. Hot drinks and morphine in large doses are indicated. Prevention of hemorrhage must not be neglected. If a patient's condition of shock be due to extensive hemorrhage, intravenous transfusion of blood or gum acacia is called for—however, in practice this procedure must wait until the patient has reached the casualty clearing station.

WOUNDS OF BLOOD VESSELS AND HEMORRHAGE.

Speaking of the control of hemorrhage the writer says: "The tourniquet is undoubtedly employed very much more often than is necessary. Except during an advance or when there is a great

inrush of cases, no man should be evacuated past the regimental aid posts with a tourniquet *in situ*. It should only be employed as a *very* temporary measure: (*a*) During a surgical operation; (*b*) to prevent severest bleeding whilst carrying a man back to the regimental aid post.

"Both medical orderlies and combatants are far too fond of using a tourniquet as part of the routine treatment of all wounds of the extremities.

"On seeing a patient with a tourniquet in position the medical officer's first duty is *to take it off*. Rarely, if ever, will serious bleeding ensue, and if it does it can always be arrested by more suitable methods.

"The dangers of the employment of a tourniquet are many. In the first place if it be fulfilling its function I can vouch from personal experience that it causes the most agonizing pain and this pain greatly adds to the shock from which the patient is already suffering. Secondly, the blood supply to the limb is entirely cut off, and hence the part becoming devitalized is a suitable nidus for the development of organisms. Thirdly, the length of time a tourniquet has been in position is directly proportionate to the probability of gangrene setting in." An eminent surgeon has stated that if a tourniquet has been applied for six hours the limb will certainly die. Though quite recognizing the danger of such a procedure, the writer states that he had a case under observation which was so left for over nine hours and the part survived.

"Another point of note is that it is quite exceptional to find an individual who can apply a tourniquet in such a way as to fulfill the purpose for which the instrument was invented. The usual procedure is to first apply it tightly, but in deference to the cries of pain from the patient to slacken it somewhat. The net result is that the venous circulation is alone excluded, and hence the arterial hemorrhage increases rather than diminishes.

"When first seen, haemorrhage can, as a rule, be effectively arrested temporarily by packing and a firm bandage or, in the case of venous bleeding, by merely elevating the limb. In the cases in which this is unsuccessful a tourniquet must be applied until the regimental aid post is reached.

"Here the wound is thoroughly examined. All visible bleeding points are caught by artery forceps; those which can easily be tied are ligated and forceps are left on the remainder. A dressing is then applied over all.

"If the bleeding consist of a general capillary oozing and there are no obvious vessels to be ligatured, it can always be arrested by plugging and bandaging firmly from below upwards. In order to apply sufficient pressure to the part without causing constriction, the

bandage should be put on over a wooden splint placed on that side of the limb opposite to the wound or wounds.

"During the journey back to field ambulance, it is always well to encircle the limb with a loose tourniquet, giving the stretcher bearers instructions to tighten it if the blood begins to show through the dressings.

"At the casualty clearing station the torn vessel is widely exposed and securely tied. In a very few selected cases it may, at this stage, be possible to restore the integrity of the torn vessel by suture. The circumstances and cases favourable for this method of treatment are extremely limited.

"In the case of wounds of main arteries, the old idea that gangrene was more likely to occur if the accompanying vein had also to be tied is now quite exploded. Facts indeed tend to prove that the simultaneous occlusion of both diminishes the risk and hence such a method is often adopted even if the vein be itself unwounded."

FRACTURES.

Although fractures may be simple in form as a general rule war fractures are complicated by a great laceration of the surrounding soft parts.

The temporary methods of treatment adopted by the regimental medical officer should, as far as possible, be identical with those which will be used when the patient reaches the casualty clearing station.

In dealing with fractures transport difficulties must be seriously considered and hence fixation rather than reduction is to be aimed at, and along with fixation, extension and easy access to the wound should, if possible, be combined.

In applying splints to a recently wounded man, there are certain points to remember:

"(1) The patient is usually seen before there is any reactionary effusion round the injured part and hence bandages must not be applied tightly or they become exceedingly painful before he reaches the casualty clearing station.

"(2) Most methods of extension entail continuous pressure on parts of the body which are not accustomed to bearing it and hence abrasions of the skin are apt to ensue. This is frequently caused by the ring of a Thomas' knee splint or by the perineal band of a long Liston's splint, and it greatly hinders the subsequent treatment of the case. In order to minimize this serious complication, all splints must be carefully padded and extension must never be excessive."

The prime object of first aid in the field is so to fix the fracture that the splint applied need not be changed until the patient reaches the casualty clearing station. Minor adjustments may be necessary

at the advanced or main dressing stations of the field ambulance, but never a complete change of apparatus.

In discussing the treatment of special fractures the author gives the following outline:

"*Humerus.*—It has been found by experience that accurate alignment of the fragments can only be obtained by abduction, and hence the deserved popularity of splints of the Thomas pattern. Abduction is, however, incompatible with transport in narrow trenches and consequently is rarely applied farther forward than the casualty clearing station. As a result, injury to the musculo-spiral nerve is not uncommon.

"The forward medical officer's method of immobilization is to support the forearm and hand in a sling, place a small pad in the axilla and bind the arm to the side.

"*Forearm.*—From an orthopedic standpoint, the arm should be put up in full supination because, if it be persistently splinted in the pronated position, ankylosis between the radius and ulna may occur with permanent loss of supination. As it is exceedingly painful to keep the forearm supinated, if the elbow be flexed, the correct method of treatment would be to put the arm up in full extension on a Thomas' splint. This being impossible farther forward than the casualty clearing station, the battalion medical officer should compromise by applying an internal rectangular splint which will keep the forearm midway between supination and pronation. If the radius be fractured, it is obviously necessary to support the hand, and for this reason both limbs of the splint must be long.

"*Fracture of pelvis.*—Here the main danger is injury to the bladder, and hence all such cases should be labeled for immediate evacuation from the advanced dressing station to the casualty clearing station. The forward medical officer should merely content himself with applying a firm binder round the pelvis.

"*Fracture of femur.*—From the battalion medical officer's standpoint, this is the most important of all fractures, partly because it is an exceedingly dangerous injury, partly because he has all the necessary appliances in his aid post to treat it efficiently from the first. Every case should be treated from the commencement with a Thomas' splint. The only exception to this rule is a case in which the wound is in such a position that the ring would press directly upon it. Here a Liston's long splint should be used. A Thomas' splint should always be used in all extensive lacerated wounds of the thigh and in all cases of severe fractures in the region of the knee joint.

"The articles necessary for putting up a fractured femur are: (1) Stretcher on two trestles with a primus stove below; (2) three blankets; (3) Thomas' splint; (4) suspension bar; (5) four triangu-

lar bandages; (6) three strong calico bandages (each 6 yards in length); (7) dressings, (8) Gooch splinting; (9) medical officer and one stretcher bearer.

"*Application of a Thomas' splint.*—(1) The injured man is placed lying flat on his back on a stretcher supported on two trestles and with a primus stove below.

"(2) The trouser leg covering the affected limb is slit along the whole length of the outer seam and the entire leg is exposed.

"(3) An orderly, by traction on the foot, extends the limb and lifts it about 12 inches off the stretcher.

"(4) The wound is suitably dressed and loosely bandaged.

"(5) Three pieces of Gooch splinting are placed around the site of fracture and fixed in position.

"(6) The ankle is encircled with two clove hitches—one on the outer side and one on the inner, the boot *not* being removed.

"(7) A Thomas' knee splint, previously prepared with five slings of linen bandage round the inner bar, is slipped over the foot until the ring rests against the tuber ischii—the assistant all the time maintaining extension on the limb.

"(8) The ends of the two clove hitches are now tied to the transverse bar at the end of the splint and by tightening them extension is obtained.

"(9) The five tails of linen bandage are then passed below the limb, looped round the outer bar and fixed in position by safety pins forming a supporting cradle in which the leg comfortably rests.

"(10) A triangular bandage is then laid across the anterior aspect of the knee and tied on either side to the lateral bars. This fixes the limb to the splint and also prevents any flexion of the knee.

"(11) To keep the ring of the splint on the tuber ischii a pad of wool is inserted beneath the ring at its junction with the outer lateral bar.

"(12) The clove hitch extension is now again tightened.

"(13) The suspension bar is now adjusted to the stretcher and the two lateral bars of the splint are attached to it by triangular bandages so suspending the limb about 6 in. off the stretcher.

"(14) To prevent jolting during the subsequent journey, the side bars of the splint are also loosely tied to the lateral bars of the suspension apparatus.

"*Fractures below the knee.*—In such cases both the knee and ankle joints must be fixed. For fractures immediately below the knee, a Thomas' splint is the most satisfactory and, for those lower down, a box splint."

ABDOMINAL WOUNDS.

Abdominal wounds may be divided into: (*a*) Wounds of the parietes; (*b*) perforating wounds. Before operation it is often

difficult and sometimes impossible to differentiate between perforating and nonperforating wounds.

The practice of operating upon all abdominal wounds has reduced the mortality by over 20 per cent, and the question of success or failure of operation is directly proportionate to the time which elapses between receiving the wound and operative interference. If a patient can be operated on within six hours of being wounded, the prognosis is distinctly hopeful; every subsequent hour which elapses greatly lessens his chance of recovery. Under these circumstances rapid evacuation to the casualty clearing station is essential; in no case should expectant treatment be adopted in the Regimental Aid Post. All solid food is, of course, withheld, but water may be given, and in every case morphia, ½ grain, should be injected hypodermically, for the purpose of relieving pain and anxiety.

CHEST WOUNDS.

"Wounds of the chest form approximately 2 per cent of all wounds.

"*Symptoms.*—The first sensation of a man who has been wounded in the chest is that of a severe blow, which he describes as "having knocked all the wind out of him." This is quickly followed by a suffocating feeling, in which he gasps for air and often shows intense respiratory distress.

"*Physical signs.*—Hemoptysis is always present when the lung tissue is injured but, unless it be quickly fatal, it tends progressively to diminish in amount until, when the patient reaches the casualty clearing station, it rarely is a cause of anxiety. Respiration is laboured and attended by a sharp pleuritic like pain; the pulse is quick and thready and intense shock is always present.

"*Prognosis.*—Hemorrhage may cause death in a few minutes, but after twelve hours from the reception of the wound is rarely serious. In a through-and-through bullet wound, unless death be instantaneous, the prognosis is distinctly good. If the diaphragm be perforated the outlook is grave but not hopeless. From the first-aid point of view the mortality is largely increased by delayed collection, difficult transport, bad weather, and rough roads.

"*Treatment* consists of: "(1) Combating shock; (2) preventing any further infection; (3) quick evacuation to hospital.

"All cases should be sent back to the advanced dressing station of the field ambulance in the semirecumbent position, upon a regulation 'trench' stretcher. In all cases morphia, ½ grain, should be given. This lessens the respiratory distress and alleviates the mental anxiety of the patient.

"If there is a valvelike opening into the pleura through which air is sucked during inspiration, forming a pneumothorax, that opening

must be closed. Personally I found the best method of doing this was by plugging the hole with gauze and firmly covering with strapping. On more than one occasion it was first necessary to enlarge the wound in order to allow air under great pressure to escape. In doing this great care must be taken to ensure that the air escapes slowly.

HEAD INJURIES.

"In trench warfare the relative frequency of head injuries to all wounds is necessarily large, as the upper part of the body is perforce more often exposed than the lower. This was especially noticeable in Gallipoli, as the Turks were extremely proficient in the art of sniping. The advent of steel helmets produced a remarkable diminution not only in the number of head injuries but, of even greater importance, in the number of penetrating wounds of the brain, *i. e.*, wounds in which the dura mater was injured.

"*Classification.*—(1) Scalp wounds; (2) compound fractures with the dura mater intact; (3) compound fractures with the dura mater injured; (4) compound fractures with gross injury to the cerebral tissue.

"The importance of the distinction between classes (2) and (3) is great, as the dura mater is the vital bar against intro-cranial infection.

"*Clinical features.*—In scalp wounds except for a certain amount of hemorrhage the only symptom may be slight headache and dizziness, but more frequently definite concussion is present.

"In cases of fracture, however, complete unconsciousness is usually found, the blood pressure is markedly lowered, the respirations are increased in frequency, and the pulse is small and rapid.

"*Treatment.*—From the first-aid point of view all that can be done is cleansing of the wound. The sooner this is done after the injury the more favourable is the prognosis.

GAS POISONING.

"As soon as the enemy commenced the practice of using poisonous gases as a weapon of warfare it became essential that all forward medical officers should know something of the action of these gases in order to formulate rational methods of treatment.

"In addition to the deliberate use of poisonous gases as a means of offensive warfare there are, inseparable from active service conditions, other forms of gassing, *e. g.*, during mining operations, &c.

VARIETIES OF GAS MET WITH.

"(1) *Cloud gas.*—Chlorine was the type most in vogue. Its rate of progress depended entirely on the velocity of the wind. With a

wind of nine miles per hour 100 yards were found to be covered in just over twenty seconds. This showed how short a warning our men received and how important it was that they should be thoroughly trained in all antigas measures.

"As it is obvious that a gas cloud attack can only be launched when a favorable wind is blowing, the practice was adopted of warning every platoon when such was the case by passing the order 'gas alert on' down the trench when each man fixed his gas helmet in the 'alert' position.

"(2) *Gas shells.*—Here the poisonous substance, as a rule benzyl or xylyl bromide, was present in the shell in liquid form, the force of the shell explosion converting it into vapor.

"Gas shells can of course be used, whatever the direction of the wind may be.

"(3) *Mine gas.*—This was frequently met in tunneling operations and, as in peace time, the type commonly found was carbon monoxide.

"(4) *Fumes from high explosive shells.*—Cases of nitrous, phosphorous, or even carbon monoxide poisoning were occasionally met with, but, as a rule, this only occurred when the explosion took place in a confined space, as when a dugout was blown in.

"(5) *Fumes from warming of billets.*—Just as under peace conditions, carbon monoxide poisoning was not infrequently found in rooms heated by coke braziers.

"*Action of gases.*—Gases may be classified, according to the action they produce on the human body, into four groups: (1) Lung irritants, *e. g.*, chlorine, nitrous oxide, phosgene; (2) Lacrymatous, *e. g.*, benzyl bromide; (3) Central nervous system poisons, *e. g.*, hydrocyanic acid; (4) Blood poison, *e. g.*, carbon monoxide.

"*Symptoms of chlorine poisoning.*—The man suddenly finds himself surrounded by a dense cloud of gas. His eyes water violently, his throat becomes intensely irritated, and his chest feels as if it were compressed by iron bands. Breathing is extremely difficult. He splutters, coughs, and probably vomits. Nausea rapidly increases, respiration becomes quick and labored, cyanosis becomes marked, and death is very imminent.

Prognosis.—80 per cent of deaths due to gassing occur in the first twenty-four hours. If the patient survives the third day he will probably recover.

"*First aid treatment.*—The battalion medical officer frequently and systematically lectures each platoon upon the necessity of properly adjusting the gas helmets of all wounded men and keeping them in position until all fear of a further attack has passed. (The duty of instructing men in the use and quick application of a gas helmet lies with the platoon and company commanders, not the medical

officer.) He also impresses upon all ranks the vital importance of keeping every man who has been gassed, however slightly, at absolute rest.

"After the order has been given to remove helmets, any man who has difficulty in breathing is given an ammonia inhalation from one of the capsules supplied to all stretcher bearers.

"All equipment is removed and all tight clothing loosened.

"Vomiting, in the early stages, should be encouraged, and, if it does not occur spontaneously, should be induced by tickling the back of the throat.

"All gas cases must be evacuated by stretcher to the Field Ambulance, none must be allowed to walk. At the Field Ambulance the main lines of treatment are absolute rest and plenty of air. Restless cases should be given morphia, collapsed cases pituitrin, and cyanosed cases continuous oxygen inhalation. All cases should be transferred to the Casualty Clearing Station as soon as possible. (W. M. K.)

Taussig, A. S., and Shere, O. M. **Hypertrophic tuberculosis of the ileocecal region.** Colorado Med. May, 1921.

The ileocecal region is one of the most frequent sites of election for intestinal tuberculosis and the particular site for the hypertrophic form. This form of the disease is a distinct clinical entity and its underlying pathology is as different from that of the ulcerative type as is the tubercular ulcer from the typhoid. The hypertrophic form is usually primary in character. The tubercle bacilli pass through the intact wall of the intestine, usually the ileum, and enter the mesenteric and retroperitoneal lymph nodes, giving rise to symptoms of tuberculosis of these structures.

The ileocecal region is the site of predilection for this form of the disease because of the anatomic and physiological make-up of this part of the intestinal canal; the great vascularity of the cecum and its abundance of lymphoid tissue; the change in the mucosa from the villous formation of the small intestine to that of the colon; the slowing down of the movement of the chyme; the chemical composition of the intestinal contents which here begin to be alkaline.

One of the most important symptoms is the low grade fever, usually subnormal in the morning and 100° in the evening. There may be exacerbations, lasting only a few days, when the temperature may reach 103°. General nutrition is usually not good. A slowly developing cylindrical tumor, movable from right to left, makes diagnosis possible. In the obstructive stage the symptoms are those of chronic partial obstruction of the intestinal tract.

The prognosis is good as a rule in those cases which have been recognized early and have had proper treatment. A tuberculous

subject should be treated the same, regardless of where the bacillus lodges. A carefully regulated diet, out-of-door life and long hours of rest should be insisted on. One or two years may be necessary to bring about a cure.

It is universally agreed that the treatment of ileocecal tuberculosis is surgical. The authors prefer ileocolostomy, with or without exclusion, to excision of the diseased intestine in the majority of cases, because of the lower mortality and the probability that the simpler operation will produce a cure. (L. W. J.)

Apperly, R. E. **The importance of an examination of patients by the anesthetist previous to anesthesia.** Proc. Roy. Soc. Med., London, May, 1921.

The increase in the variety and accuracy of the methods of administration of anesthetics is of the greatest value to the patient and the surgeon, but it places, at the same time, a much greater responsibility on the anesthetist in his choice of the method which he shall adopt in any given case. Comparatively recently there has been introduced spinal analgesia, anesthesia by intratracheal insufflation, by the introduction of oil-ether into the bowel, the more extensive use of nitrous oxide, and the increased use of regional and infiltration anesthesia. However, in spite of these many and great improvements, post-operative illness still occurs. We occasionally see lung complications delaying recovery—though the use of atropine has made them comparatively rare; renal complications and acidosis are sometimes seen and deaths during anesthesia are not unknown. This means that there is still room for improvement, and the author contends that the results can best be bettered by a thorough physical examination of the patient to be anesthetized some time before operation.

The age and sex of the patient, the nature of the operation, and the surgeon who is to perform it, all influence the choice of the anesthetic; and an examination of the condition of the patient's cardiovascular, respiratory, or nervous systems, or the efficiency of his kidneys often give us unpleasant surprises. Each patient should be subjected to a methodical examination, and if that be undertaken some time previous to the operation it gives the anesthetist time, if complications are discovered, to think out the line of action best suited to the case.

From the patient's viewpoint, a surgical operation, especially if it be his first experience, is an adventure which he naturally anticipates with apprehension, and often it is the anesthetic which he dreads most. A visit from the anesthetist before hand means that he does not meet an absolute stranger at the time of the operation, and the anesthetist is often able to remove many groundless fears.

A rigid physical examination assures the patient that nothing is being left to chance, and that every possible care is being taken.

By such a visit the anesthetist gets a general impression of the type of patient with whom he is dealing, and from his examination he is able to judge how the operation will be borne. To learn of previous experiences with an anesthetic may be helpful, or the fact that morphia has made the patient sick on a previous occasion may influence the anesthetist in deciding what preliminary hypodermic may be necessary.

During the examination, preliminary to the administration of an anesthetic, it is surprising how many medical conditions are encountered—emphysema, bronchitis, chronic or early pulmonary tuberculosis, asthma, valvular disease of the heart. None of these may be, perhaps, of great significance to the anesthetist if he knows of their presence, but they may be possibly fraught with considerable danger if he is unaware of it. An anesthetist should know especially of myocardial degenerative changes which are difficult to detect. An examination of the urine should always be made.

Minor cases demand the same care as serious operations; in fact, it is in the minor cases that the patient runs the greatest risk, because the anesthetist is often inclined to look upon them as slight affairs, and make inadequate preparation. (W. M. K.)

GABRIEL, W. B. **Results of an experimental and histological investigation into twenty-five cases of rectal fistulae.** Proc. Roy. Soc. Med. London, June, 1921.

This investigation was undertaken with the object of ascertaining what percentage of rectal fistulae was tuberculous, the proof required being the definite demonstration or isolation of the tubercle bacillus. The author's conclusions are as follows:

(1) In tuberculous fistulae the tubercle bacilli are very few in numbers, and are most certainly demonstrated by concentration with antiformin and by inoculation into guinea pigs. By this method 20 per cent of fistulae were proven to be tuberculous (6 out of 30).

(2) Tubercle bacilli may be found in stained sections of the fistulous granulation tissue, most likely places being inside, or in the region of giant cells. The sections should be cut moderately thick. By this means 9 per cent of fistulae were proven to be tuberculous (4 out of 45). The bacilli are so scarce that a negative finding is valueless until many sections have been examined.

(3) Other methods of demonstrating the bacilli are: (*a*) Examination of films of the prepared antiformin deposit; this proved negative in the thirty cases examined; (*b*) culturing the antiformin deposit on special medial, such as Dorset's, or the medium recommended by Wilson.

(4) If histological examination only is carried out, and if no tubercle bacilli are found in sections, a consideration of giant cells can only give a presumptive diagnosis. The presence of groups of large oval or round giant cells with peripheral nuclei, especially if associated with caseating areas, collections of polymorphs or well-marked fibrous tissue capsules, is in favour of the tissue being tuberculous. The absence of giant cells does not exclude the possibility of the tissue being tuberculous.

(5) Clinically, tuberculous fistulae present their characteristic appearance best in subjects under 30. In older subjects the fistulae are frequently not so characteristic, and are not so usually complicated with active pulmonary tuberculosis. (W. M. K.)

BLAKE, J. A. **The treatment of fractures of the humerus by suspension and traction.** Am. Jour. Surg., May, 1921.

The treatment of fractures of the humerus by suspension was devised to combat the swelling of the arm, forearm, and hand so common in infected gunshot fractures of the arm, its advantages in facilitating dressings and the very good reductions and early unions obtained brought it into general use for all fractures of the humerus, simple as well as gunshot. The chief objection to it has been the confinement of the patient to the bed. In uninfected gunshot fractures union was obtained within twenty days and patients were using their arms within thirty days; in an average, suspension was discontinued after four weeks.

The Balkan or gallows frames are used for suspension. No splints are required in the treatment. Immobilization is achieved by traction aided to a certain extent by the position in which the limb is suspended. Although the fragments are efficiently immobilized, yet motion is permitted at both the shoulder and elbow joints, which prevents stiffness in these joints. The traction bands are made of any of the standard adhesive materials. The position in which the arm is suspended depends entirely upon the location of the fracture. In all fractures except those of the surgical neck, the arm lies in a sling in a horizontal position and the forearm is flexed at a right angle to the arm. The degree of flexion of the forearm is increased or decreased depending on the location of the fracture.

In fractures of the upper part of the shaft the proximal fragment takes a position of extreme abduction, and as it is impossible to control its position, the distal fragment must be brought into line with it; consequenly as traction must be made in this line, the pulley over which the traction cord runs must be placed at right angles to the bed. In fractures above the insertion of the pectoralis major and latissimus dorsi, the proximal fragment is also rotated outward so that the distal fragment must be rotated correspondingly. This is

accomplished, the patient being in the recumbent position and the forearm flexed to ninety degrees by keeping the suspension pulley for the forearm in the vertical plane passing through the humerus and traction pulley until the direction of traction passes the angle of ninety degrees with the body.

The advantages of this method of treatment of fractures of the humerus are motion in elbow and shoulder joints which prevents the disagreeable ankylosis following the splint method of treatment of fractures close to the joint. Suspension method corrects rotary as well as angular deformity. (J. J. S.)

HITZROT, J. N. **Fractures of the head and neck of the radius.** Am. Jour. Surg., May, 1921.

Fractures of the head of the radius occur in about the same proportion as fractures of the patella. It is usually produced by falling on the outstretched hand. Previous classifications have divided the fractures of the upper end of the radius into those of the head and those of the neck. This paper classifies them according to the relationship of the fracture line to the orbicular ligament and to the superior radio-ulnar joint. (1) Includes all fractures which occur in the region of the upper radio-ulnar joint capsule and includes epiphyseal separation. (2) Includes those fractures below the region of the joint capsule and above the attachment of the biceps tendon. The essential difference in the two main groups is not so much the extent of the bone injury as it is the amount and degree of injury to the orbicular and associated ligaments and to the superior radio-ulnar joint.

Fractures of the head may be, a small fragment broken from the periphery, with slight separation of the fragment from the bone, or the fracture line may split the head into many fragments, with displacement of the fragments. In this variety the orbicular ligament is extensively torn. Fracture of the neck of the radius is a relatively less frequent injury. It is usually produced by severe trauma, chief differential point being no tenderness over the head of the radius in the cubital fossa, but the tenderness seemingly lies beneath the long supinator muscle.

In the treatment, the following points are given: Immediate immobilization with the elbow flexed to a right angle and the forearm midway between full pronation and supination. Daily massage and dry heat during the second week and continued during convalescence. Operation may be required for loss of function. The criterion for operation is the failure to obtain a gradual increasing range of flexion, extension, and supination. The time for operation is usually at the end of the eighth week. (J. J. S.)

TROPICAL MEDICINE.

Treston, M. L. **Oriental sores.** The Lancet, August 6, 1921.

The author cites his experience with oriental sores in Mesopotamia. The sores were as a rule multiple and the incubation period varied from three to six months; cases were more numerous during the cool portion of the year—September to April. *Leishmania donovani* (or *tropica*) could only be found in the early lesions—the macular and recent ulcerative type—while the veldt diplococcus could be found in most of the older sores. From the exposed position of the sores various biting insects have been cited as carriers, but definite proof on this point has yet to be established.

The type of sore in Mesopotamia varied from the small bluish-red macule to the large, irregular, thick margined ulcers, having scabs dotted with pus puncture holes.

A complication occasionally encountered was a thrombosis of the veins draining the area in which the ulcer was situated.

The results of the various modes of treatment lead to the conclusion that for early sores X ray was curative; for older sores the best results were obtained with intravenous injections of tartar emetic. The old sore was the least amenable to medicinal treatment. Thorough curettage under an anesthetic with a castor-oil dressing, later replaced by a stimulating ointment, gave the best results. (W. M. K.)

Fróes, J. A. G. **A case of afebrile quartan malaria with urticaria.** Jour. Trop. Med. London, August 15, 1921.

This author describes a case of malaria with urticarial manifestations every four days at the same hour without any other symptoms. The author suspected malaria from the periodicity of the urticaria and on examination of the blood found the *P. malariae*. The patient slowly responded to quinine. In addition the author has had two other cases suffering from urticaria of malarial origin but in them the parasite was *P. vivax*. He further states that marked paludism is found more often in Bahia (Brazil) under the forms of neuralgia, hepatic colics, headaches, lethargy, coma, conculsions, and polyneuritis. (E. P.)

Cawston, F. G. **Three schistosomes in Natal which possibly attack man.** Jour. Trop. Med. London, September 15, 1921.

This author finds in Natal in addition to infection with *Schistosoma haematobium* and *S. mansoni*, some evidence that *S. bovis* attacks man. The ova of the latter resemble somewhat those of *S. haematobium* both possessing terminal spinal ova. The ova of *S. bovis* are uniformily larger and narrower. (E. P.)

HOGUE, M. J. **The cultivation of trichomonas hominis.** Am. Jour. Trop. Med. July 1, 1921.

This author describes a new simple medium for the cultivation of Trichomonas hominis. A hen's egg is thoroughly shaken up in a flask with glass beads. To this is added 200 c. c. of Locke solution which is made in the following way:

Sodium chloride	0.9	gram.
Calcium chloride	0.024	gram.
Potassium chloride	0.042	gram.
Sodium carbonate	0.02	gram.
Dextrose	0.25	gram.
Distilled water	100.	c. c.

This is heated over a hot-water bath and kept in constant motion for 15 minutes, filtered through cotton with a suction pump and about 6 c. c. of the filtrate put into test tubes. These are autoclaved for 20 minutes under 15 pounds of pressure. Ovomucoid medium—

Whites of two eggs shaken up with glass beads.
Add 200 c. c. of 0.7 per cent sodium chloride solution.
Cook for ½ hour over a hot-water bath.
Filter, tube and autoclave.

No cyst formation was seen in any culture on these media. (E. P.)

CRICHLOW, W. **Acute bacillary dysentery.** Jour. Trop. Med. London, August 1, 1921.

Acute bacillary dysentery is very common in the British Solomon Islands, although this has not been proved bacteriologically. The fact that liver abscess is unknown, chronic dysentery rare, and emetine beneficial in very few cases goes to prove that amebic dysentery must be very rare.

Epidemics of acute bacillary dysentery occur in cycles, and every epidemic leaves its sad toll of deaths among the natives and materially reduces the population. Whole villages are sometimes wiped out.

The author holds the fly responsible in causing and maintaining epidemics. He points out the difficulty of handling the situation when it is realized that he is the only Government medical officer for the whole of this Protectorate, which contains a population of 100,000 natives and 600 Europeans and nonnatives. Besides himself, there is a medical missionary.

Dr. Crichlow shows that the following line of treatment has proved to be very beneficial. Rest in bed, liquid diet during the acute stage; milk, rice water, barley water, albumen water, and whey;

later arrowroot, cornflower, sago, beef or chicken broth, milk custards, and soft boiled rice are given when the blood and mucus are absent from the stools. On admission 1 oz. of castor oil and 20 minims of tinct. opii are given. Next day two to four of the following powders are given every four hours: Bismuth salicylate, 5 grains: Dover's powder, 3 grains; calomel, 1¼ grains; a saline is given every morning. This treatment is kept up until the blood and mucus disappear from the stool. The following powder is given for at least a week: Bismuth salicylate 5 grains, and salol 5 grains—two to four powders three or four times a day. Rectal injections of mild antiseptics were found useful. (E. P.)

Hannibal, E. A., and Boyd, M. F. **The monilias of the gastrointestinal tract in relationship to sprue.** Am. Jour. Trop. Med. May, 1921.

These authors isolated monilias from 22 cases (5 sprue patients, 100 per cent, and 17 controls, 50 per cent), all of which conformed to Ashford's description of monilia psilosis. They differentiated the organism found into three types or groups, any one of which fulfills his description. No other species of monilia were found, although other cultures of yeastlike organisms closely allied to true yeasts were secured.

They also conducted a limited number of feeding experiments with guinea pigs, giving no conclusive results, however.

They conclude: "Since monilia psilosis is present in a larger proportion of controls than we probably are justified in regarding as healthy carriers of a pathogenic organism, it appears that some other factors are of causative importance in the production of sprue besides its mere presence in gastrointestinal tract." (E. P.)

Darling, S. T. and Smillie, W. G. **Studies on hookworm infection in Brazil.** Monographs of the Rockefeller Institute for Medical Research, February 1 1921.

These authors state that 99 per cent of the population of rural Brazil over 6 years of age is infected with hookworm. They have found both the *Ankylostoma* and *Necator*, but the latter in marked preponderance, proportion of 1:45. They found that under usual conditions in Brazil, that is to say, with an average hemoglobin index of 60 per cent or more, and an average infection of 50 to 200 hookworms per case, the routine field treatment of 1½ c. c. of oil of chenopodium in divided doses, given twice at 10-day intervals by a nurse, is entirely satisfactory. In more heavily infected districts a

third treatment is advisable. The chenopodium should be given in a dosage of 1½ c. c. for adults divided into equal parts and administered two hours apart on a fasting stomach and followed in 1½ hours by a purge.

They strongly advise against the use of Beta Naphtol in routine treatment.

The microscope was found to be of little value as an index of cure. They point out that an individual in a heavily infected community who has received two routine treatments with chenopodium still harbors on an average of about six worms each. Sixty per cent of the community is entirely freed from worms. The time and effort required to carry out extensive microscopic examinations to pick out those who still harbor a few worms could be expended to a much better advantage in prophylaxis and educational propaganda. (E. P.)

Bates, L. B., Dunn. L. H., and St. John, J. H. **Relapsing fever in Panama.** Am. Jour. Trop. Med. July, 1921.

These authors describe how six American boys contracted relapsing fever after spending several nights in the native town of Arraijan, in a hut infested with many ticks. The boys admitted to hospital made a quick and complete recovery after a single dose of neo-salvarsan.

Investigation of the premises where the boys had spent the nights in the native town showed that they had slept in a bed made of bamboo poles. When the bed was taken apart it was found that human ticks, *Ornithodoros talaje*, were present in large numbers, about 250 adults and nymphs and 75 unfed larvae were collected from the bed, nearly every joint being infested.

The authors injected rats with emulsions of some of the ticks taken from the bed and were able to show within five days the presence of spirochaetes in the blood of the rats; a number of larvae were fed on infected rats. After molting and developing into first-stage nymphs, 24 of them were placed on a monkey to feed. On the 9th day spirochaetes were found in the monkey's blood; spirochaetes were also found in the natural infected ticks.

American soldiers volunteered for experimentation and three men were infected as follows:

(1) With blood from the infected white rats.

(2) With suspension of ticks brought from the bamboo bed.

(3) By direct bites of ticks from same bed.

All three cases developed relapsing fever and spirochaetes were found in the blood of all three.

Identification of the spirochaetes is being made. (E. P.)

BAHMACHARI, U. N. **The treatment of kala-azar with some new antimonial preparations.** Jour. Trop. Med. London, August 15, 1921.

This author speaks about the fertile field open for investigations in discovering new organic antimonial preparations for the treatment of kala-azar and associated conditions. He has succeeded in preparing several new preparations such as ammonium antimonyl tartrate, phenyl-stibinic acid and its sodium and ammonium salts, P-amino-phenyl-stibinic acid and its sodium salt, acetyl-amino-phenyl stibinic acid and its sodium salt and narcotine-antimonyl-tartrate. He concludes, however, that the best antimonial preparation to be used in the treatment of kala-azar has not yet been discovered. (E. P.)

HAUGHWONT, F. G. **Note on a case of human infection with Isospora hominis, probably originating in the United States.** Jour. of Parasitology, September, 1921.

This author describes a moderately heavy infection with *Isospora hominis* in an American recently arrived in Manila from the United States, where he believes disease was contracted. He calls attention to the number of cases of human coccidiosis that were being detected in the Eastern Mediterranean area and in troops returned from there. He also emphasizes the possibility of further spread of this condition and the comparatively little knowledge we have of the clinical phenomena and pathology of "human coccidiosis." In spite of the general impression at present time that the disease is not harmful to man, he believes it unwise to adopt too placid an attitude toward these parasites and recommends an intensive study of the condition, especially from an epidemiological standpoint. (E. P.)

SCHMITTER, F. **The etiology of gangosa and its relation to papulo-circinate yaws.** Jour. Trop. Med. London, September 1, 1921.

The author differentiates between two types of yaws, the raspberry yaws, or framboesia, in which he found the uniformly fine corkscrew type, *S. pertenuis*, and the "papulo-circinate ringworm," "syphilitic" yaws, in which a coarse corkscrew spirochaete was found (1 case) in the nonulcerated lesions. In two cases of ulceration, one gangosa and one of the skin, spirochaetes were found of the same coarse corkscrew type as in papulo-circinate yaws. He suggests that "papulo-circinate" yaws may be a separate variety of disease from framboesia, and that gangosa and similar tropical ulcerations constitute a late stage of said papulo-circinate yaws. (E. P.)

PHYSIOLOGICAL CHEMISTRY.[1]

Doisy, E. A. and Eaton, E. P. **Ion migration between cells and plasma.** Jour. Biological Chem., July, 1921.

Recent work would indicate that "hemoglobin is by far the most important factor in the transport of carbon dioxide from the tissues to the lungs. As it is nondiffusible, an auxiliary reaction is utilized to assist the plasma to take up or give off carbon dioxide. This mechanism is a shifting back and forth across the cell membrane of hydrochloric acid. As we picture the process it is dependent upon a very slightly varying hydrogen ion concentration of the plasma. In the capillaries where the tension of carbon dioxide is high the hydrogen ion concentration of the plasma tends to increase. This produces the shift of HCl to the cells. At the same time there is the reduction of the oxy-hemoglobin which alone would produce a more alkaline raction within the cells. The two effects are normally so well balanced that there is practically no alteration in the hydrogen ion concentration of the blood. In the lungs the reverse process occurs; namely, a loss of carbon dioxide from the plasma, oxygenation of the hemoglobin, and a shift of hydrochloric acid back to the plasma."

A reversible reaction of the nature of

$$H_2CO_3 + NaCl \rightleftarrows NaHCO_3 + HCl$$

is involved, which, of course, is important in connection with acidosis, and preservation of the normal alkaline reaction of the blood.

In vitro experiments upon beef blood showed: "(1) Equivalence of loss of chloride to gain in bicarbonate of serum. Though a migration of phosphate may occur, it is quantitatively of little importance in the transport of carbon dioxide; (2) nontransference of either potassium or sodium from cells to serum; and (3) a marked increase of corpuscle volume with increasing tensions of carbon dioxide." (C. W. O. B.)

Hess, A. F., McCann, G. F., and Pappenheimer, M. M. **Experimental rickets in rats.** Jour. Biological Chem., July, 1921.

"Young rats receiving a diet complete except for a lack of the fat-soluble vitamine invariably failed to grow and generally developed keratitis. The keratitis developed less frequently when the ration included orange juice. If this diet is continued for a period of months the animals die, either of inanition or, more often, of some intercurrent infection. The skeletons of such rats show no gross changes whatsoever. Microscopic examination of the bones of 22 rats on a ration of this character presented definite signs of a lack of osteogenesis, but in no instance lesions resembling rickets. In view

[1] Acknowledgment is tendered to "Chemical Abstracts" for much of the material in this section.

of these results and their conformity with our previous experience in regard to infantile rickets, we are of the opinion that this vitamine can not be regarded as the antirachitic vitamine, and that, if the diet is otherwise adequate, its deficiency does not bring about rickets." (C. W. O. B.)

McClendon, J. F. **Extraction and concentration of vitamines.** Jour. Biological Chem., July, 1921.

A description is given of methods suitable for efficient commercial extraction and concentration of the vitamines A, B, and C, so that they can be preserved for later use without the use of very expensive reagents. (C. W. O. B.)

Haggard, H. W. and Henderson, Y. **Respiration and blood alkali during carbon monoxide asphyxia.** Jour. Biological Chem., July, 1921.

"In previous papers we have demonstrated that a decrease of blood alkali may be induced in two almost diametrically opposite ways: (1) The acidotic process and (2) the acapnial process. In the acidotic process strong acids find their way into the blood, partially neutralize the $NaHCO_3$ of the plasma, and overload the corpuscles with acid. A differential test of this condition may be carried out by causing the subject to inhale air containing 6 or 8 per cent CO_2. If the acid intoxication is extreme and the inhalation is pushed, the animal is soon killed by the excessive acidity thus induced in the blood."

"In the acapnial process, on the other hand, various influences and conditions excite the respiratory center through agencies other than increase of hydrogen ion concentration. This results in overbreathing and an excessive elimination of CO_2, which leaves the blood abnormally alkaline. A gradual compensatory disappearance of alkali from the blood follows. Subjects in this condition respond favorably to inhalations of carbon dioxide. Such inhalations not only overcome the alkalosis, but also rapidly recall alkali to the blood. It will be seen in the experiments here to be reported that it is the acapnial and not the acidotic process which comes into play. In a condition of acidotic origin the administration of sodium bicarbonate should be beneficial. It should be injurious in acapnia; and, as we find, it is injurious, and even fatal, in carbon monoxide asphyxia."

The authors are inclined to consider acidosis, i. e., a spontaneous high ratio of $H_2CO_3 : NaHCO_3$, or high hydrogen ion concentration, as a restorative process, as an effort of the body to recall more of its alkali into use in the blood; and that alkalosis represents an effort and is the normal method of the organism to lower blood alkali.

Attention is called to recent work in which the inhalation of 6–10 per cent carbon dioxide was beneficial for dogs after carbon monoxide asphyxia, and also for men in the state of depression following prolonged etherization, in which condition also acapnia is a factor.

From experiments upon dogs, the following conclusions were reached:

"Carbon monoxide asphyxia induces, not acidosis, but alkalosis. The lowering of blood alkali is due to the acapnial, not the acidotic, process. The anoxemia induces excessive breathing (up to 300 per cent or more), and the decrease of blood alkali is an attempt at compensation."

"The rate of oxygen consumption is scarcely, if at all, decreased until death is imminent, but the respiratory quotient may be more than doubled."

"After section of the vagi, on the contrary, anoxemia due to carbon monoxide causes no overbreathing, and no distinct lowering of blood alkali, even up to death. This fact appears to be a decisive demonstration that oxygen deficiency itself does not directly cause in the tissues and blood an increased production of organic acids." (C. W. O. B.)

Shaffer, P. A. **Antiketogenesis.** Jour. Biological Chem., July, 1921.

Experimental proof is produced to the effect that ketonuria (even in diabetes mellitus) is proportional to the excess of ketogenic over antiketogenic substances in the mixture being katabolized. Such antiketogenic substances are glucose, fructose, and glycerol, while lactic acid is not effective in vitro.

These results parallel the well-known facts that carbohydrate starvation in normal subjects and in diabetics will produce ketosis, and that the ketosis of diabetes mellitus can be controlled by carbohydrate ingestion. (C. W. O. B.)

Dutcher, R. A., Harshaw, H. M., and Hall, J. S. **The effect of heat and oxidation upon the antiscorbutic vitamine.** Jour. Biological Chem., August, 1921.

"The antiscorbutic vitamine is not destroyed by heating at pasteurization temperature (63° C.) for 30 minutes in closed vessels or by boiling (100° C.) for 30 minutes under reflux condensers."

"Hydrogen peroxide possesses some destructive action when added to orange juice at room temperature and the destructive action is increased when the orange juice-hydrogen peroxide mixture is heated at 63° and 100° C."

"The antiscorbutic properties of orange juice are susceptible to oxidation, but in the absence of oxidizing agents are stable to heat up to the boiling temperature of orange juice." (C. W. O. B.)

McCollum, E. V., Simmonds, N., Shipley, P. G., and Park, E. A. **The production of rickets by diets low in phosphorus and fat-soluble A.** Jour. Biological Chem., August, 1921.

"In the first place, the experiments showed that it was possible to produce a pathological condition in the rat unquestionably similar to the rickets of the human being through the diet alone. In the second place, they showed that rickets could be induced by means of a ration, the faults of which were clearly defined and sharply limited; viz, deficiencies in phosphorus and fat-soluble A. In the third place, they indicate that deficiency of phosphorus in the ration insufficiently supplied with fat-soluble A would give rise to rickets only when calcium was present in a ratio considerably higher than the calcium-prosphate ratio which is optional for ossification. The experiments indicated, therefore, that the development of rickets in this instance depended on the existence in the faulty ration of (1) a specific disproportion in the calcium-phosphate ratio, the phosphorus being low, the calcium, relatively speaking, high. and (2) an insufficiency of an organic substance contained in cod liver oil having a profound influence on the calcification of cartilage and the ossification of bone."

"We have already called attention to the fact that butter fat as compared with cod liver oils is exceedingly low in its ricket-inhibiting properties * * *."

"Patent flour is one of the most deficient foods which enters into the human diet, being exceeded in this respect only by isolated foods such as starch, sugars, fats, or polished rice. Bolted flour is rather poor in protein and this is of rather poor quality. It is very deficient in calcium, phosphorus, sodium, chlorine, iron, and possibly also in potassium. The only essential inorganic element which it probably contains in amount sufficient to meet the physiological needs of an animal is magnesium. Bolted flour is also very deficient in the antineuritic substance (water-soluble B). It is exceedingly poor in fat-soluble A, and in the organic antirachite factor. The lack of antiscorbutic substance in flour is, we believe, a matter of little or no importance in the nutrition of the rat, since this species is capable of synthesizing this complex." * * *

"*Apparently in the rat the profound disturbances in the deposition of lime salts in cartilage and bone and the changes in the cells of those tissues which give rise to the pathological complex known as rickets may be produced by disturbances in the diet of the optimal ratio between calcium and phosphorus in the absence of an amount of an organic substance contained in cod liver oil sufficient to prevent them. It would seem from the results of a large number of experiments, which will be published in detail soon, that in so far as calcium and phosphate are concerned, the physiological relation in the diet between the two is of infinitely greater importance in insur-*

ing normal calcification than the absolute amount of the salts themselves." (C. W. O. B.)

RAKESTRAW, N. W. **The effect of muscular exercise upon certain common blood constituents.** Jour. Biological Chem., August, 1921.

Human subjects performed two kinds of exercise—short and strenuous (running up and down a double flight of stairs, about 20 feet in height, as rapidly as possible for less than 15 minutes, this representing an average of about 58,000 foot-pounds of energy per 10 minutes), and longer and more tedious (2 to 3 hours of bicycle riding). The first resulted in exhaustion, and the second in a distinct state of fatigue.

Examination of the whole blood (values for plasma and corpuscles, as well as ratios, were also determined, but are omitted here) gave the following average results, any percentages noted representing the variation from the amount determined before exercise (i. e., 100 mg. sugar per 100 c. c. of blood before and 125 mg. after exercise would be a 25 per cent increase):

	Short period.	Long period.
Sugar	Increase (37 per cent)	Decrease (5 per cent).
Uric acid	Increase (7 per cent)	Increase (23 per cent).
Urea nitrogen	No noticeable effect	Increase (9 per cent).
Nonprotein nitrogen	do	Increase (8 per cent).
Creatinine	Remained remarkably constant.	
Cholesterol	Variable (average 5 per cent decrease).	Variable (average 4 per cent decrease).

(C. W. O. B.)

HART, E. B., STEENBOCK, H., AND HOPPERT, C. A. **The comparative influence of green and dried plant tissue, cabbage, orange juice, and cod liver oil on calcium assimilation.** Jour. Biological Chem., September, 1921.

Experiments with goats showed, among other things, that cod liver oil will consistently improve calcium assimilation. Neither orange juice nor cabbage (raw or dried) had any consistent effect, which would eliminate the antiscorbutic vitamine as a factor in calcium assimilation, and conform with clinical experience in rickets. (C. W. O. B.)

BENEDICT, S. R. AND OSTERBERG, E. **A method for the determination of sugar in normal urine.** Jour. Biological Chem., September, 1921.

A new, simple, and accurate method is described. Results quoted on eight normal human urines gave an average of 0.107 per cent (0.068 to 0.220) before and 0.053 per cent (0.033 to 0.075) after fermentation. (C. W. O. B.)

HAMMETT, F. S. **Parathyroids and creatinine.** Jour. Biological Chem., September, 1921.

Experimental data are developed that tend to prove an inhibitory effect of the parathyroids upon creatinine formation from muscle creatine. (C. W. O. B.)

VAN SLYKE, D. C. **Variations in the acid-base balance of the blood.** Jour. Biological Chem., September, 1921.

This article reviews the present conception of this subject (including its phase, acidosis) resulting from recent work.

The hydrogen ion concentration (or its derivative, pH) of the blood varies as the ratio between concentrations of carbonic acid and bicarbonate, i. e., a relative increase in the carbonic acid increases the hydrogen ion concentration and lowers the pH, and vice versa. Mention is made of the factors tending to influence this ratio, viz:

To increase or protect bicarbonate:

1. Administration of same.
2. Loss of gastric HCl caused by obstructing the pylorus, and regularly washing out the stomach for some days.
3. Processes indicated by increased excretion via the urine of ammonia (diverted from urea formation) and titrable acid (including buffer acids, such as acid phosphates).
4. Possibly a shift of HCl to tissue cells from the plasma like that from plasma to blood cells.

To decrease bicarbonate:

5. Acid substances.
   - (*a*) Increased production.
   - (*b*) Decreased elimination.
   - (*c*) Administration of same.
6. Diuresis, and elimination via the urine.
7. Lack of factor 3 above.
8. The hyperpnoea of oxygen want.

To increase carbonic acid:

9. Administration of same.
10. Impaired diffusion in the alveoli of the lung.
11. Slowing of respiration.

To decrease carbonic acid:

12. Hyperpnoea.
    - (*a*) Voluntary.
    - (*b*) Due to disease processes.
    - (*c*) Due to low oxygen in air.
    - (*d*) Emersion from warm water.
13. Low atmospheric content of carbon dioxide.

The important buffers (substances whose function is to prevent changes in pH as the result of added acid or alkali) of the blood are

plasma protein, cell phosphates, hemoglobin, and bicarbonate. The average total alkali of normal human blood available for the neutralization of invading acids is equivalent to 63 volumes per cent of bicarbonate carbon dioxide, of which 46 volumes per cent belong to bicarbonate alkali and 17 volumes per cent to the other buffers (mostly hemoglobin). Buffers from the tissues or other body fluids also become available in extreme cases. The bicarbonate first meets the onslaught, and it will maintain a normal pH until reduced to one-fourth (perhaps even to one-eighth) of its normal value. If, nevertheless, the pH falls (and only then), the other buffers ("available only when the pH falls to 7.0") are used, and, if it reaches 7.0, most of the remaining bicarbonate becomes available.

The pH of the other body fluids (not the excretions) probably closely approximates, and promptly follows any change in, that of the blood plasma.

The definition of acidosis may now be given as a condition caused by acid retention sufficient to lower either the bicarbonate or the pH of the blood below normal limits.

The normal pH of the blood may be given as 7.3 to 7.5, each individual, however, probably having narrower limits. Variations to the acid side may, for a short time at least, be as low as 7.0, although not much lower without fatal results: 7.0 is considered as the point where coma occurs. Variations to the alkaline side (alkalosis) beyond 7.8 are accompanied by symptoms of tetany (carpopedal spasm, Chvostek's sign, Erb's sign, Trousseau's sign, etc.), although one is not at present justified in assuming that all tetany is either caused or accompanied by alkalosis. So the extreme range of reaction compatible with life probably lies approximately between 7.0 and 7.8.

Accordingly, variations in the acid-base balance of the blood may be stated as follows: The blood bicarbonate may be high (A), low (B), or normal (C), and in each of these conditions the pH may be high (′), low (″), or normal (‴). There are, then, nine theoretically possible conditions, all of which can be produced experimentally, and some of which are found clinically. As long as the pH remains normal, the condition is compensated (A‴, B‴, or C‴); otherwise, it is uncompensated. Any abnormal state may progress beyond limits compatible with life, or compensatory processes will endeavor to change it to the normal condition, C‴, or at least to one of compensation. For a clear comprehension of these nine conditions, together with their compensatory processes, one must bear in mind the ratio that determines the pH, mentioned at the beginning of this abstract. I will designate these states as indicated in the parentheses, and refer to the factors as numbered earlier in this abstract.

A′ is uncompensated alkali excess. Factors 1 (overdose) and 2 will produce it. It will be accompanied by compensatory factors,

such as 6 (may excrete several grams of bicarbonate per hour), 7 (titrable acid may become a negative quantity), and 11.

B′ (partial compensation) and C′ cover uncompensated carbon dioxide defecit, C′ representing the first result of lowering the carbonic acid concentration in the blood by a respiratory stimulus other than either the blood hydrion or the carbonic acid concentration. Genesis: Factors 12a, c, or d. Compensatory: Factor 6 (only a fraction of a gram of bicarbonate excreted per hour), and retention of acid metabolites as shown by factor 7.

A‴ is compensated alkali or carbon dioxide excess. Genesis of former: Factor 1 (the moderate overdose orally administered, which usually is not absorbed rapidly), and as entire compensation for A′. Genesis of latter: Factors 10, possibly 4, and as entire compensation for A″. Differential diagnosis: Latter is associated with cyanosis, either permanent or caused by slight exertion.

C‴ is the normal for the resting individual in health at ordinary altitudes. May be final compensatory result from A‴ or C″.

B‴ is compensated alkali defecit or carbon dioxide defecit. Genesis of former: Factors 5a or b. Compensatory for former: Factors 3, or 12b. Genesis of latter: Factors 12, 13, and as entire compensation for B′. Compensatory for latter: Factor 8.

A″ (partial compensation) and C″ are uncompensated carbon dioxide excess. Genesis: Factors 9 (air with 3 to 5 per cent of carbon dioxide), 10, and 11. Compensatory: Factors 3, 12, and probably 4.

B″ is the premortal uncompensated alkali defecit. Genesis: from B‴.

Various clinical conditions may manifest these variations of acid-base balance as follows:

Acidosis (as heretofore usually recognized): B‴ (alkali defecit), or B″.

Tetany (possibly such as may follow parathyroidectomy): From A′, B′, or C′.

Emphysema: A‴ (carbon dioxide excess).

Diabetes mellitus: B‴ (alkali defecit), or B″.

Nephritis: As for diabetes mellitus.

Marasmus of infants: As for diabetes mellitus.

Pneumonia: A″ or C″.

Some cardiac cases: B″.

Shock (handling of intestines): Bicarbonate lowered.

Deep ether anesthesia: B″.

Morphine narcosis: A″ or C″.

Overdose of sodium bicarbonate: A′ or A‴ (alkali excess).

Breathing of air containing three-fifths of 1 per cent of carbon dioxide: A″ or C″.

As a result of high altitudes: B′, C′, or, when acclimated, B‴ (carbon dioxide defecit).

The actual state of this balance can only be determined by the use of any two of a number of interdependent variables, such as total carbon dioxide (carbon dioxide combining power; blood bicarbonate), carbon dioxide tension, hydrogen ion concentration, carbonic acid concentration, other buffers than bicarbonate, plasma chloride, ration of oxyhemoglobin to hemoglobin, etc. Of these, the first named is of special value, inasmuch as it measures the reserve of the most important blood buffer, bicarbonate. The conditions (diabetes mellitus, nephritis, metabolic disturbances of infants, and most other pathological as well as normal conditions) most commonly examined in this respect usually present a normal pH, and, when only one determination is made, either the carbon dioxide tension or the carbon dioxide combining power of whole blood (preferably) or plasma will suffice. With an abnormal pH, however, determination of only one variable will be inadequate to accurately define the condition. (C. W. O. B.)

Sullivan, M. X. and Dawson, P. R. **Thiocyanate content of the saliva and urine in pellagra.** Jour. Biological Chem., 1921, XLV, 473.

"The increase of the 'SCN of the saliva and urine seems to be associated with the betterment of the general condition of the patient, with better assimilation, a higher protein metabolism, and presumably a greater detoxifying power of the system as a whole. The increase of the 'SCN of the urine at discharge over that of entrance, however, is not proportional to the increase of the total N of the urine." (C. W. O. B.)

EYE, EAR, NOSE, AND THROAT.

Scal, J. C. **The use of scarlet red emulsion in atrophic rhinitis (ozena). (A preliminary report.)** Laryngoscope, Vol. XXXI, No. 8.

The author used a 4 per cent emulsion of scarlet red in the treatment of a series of 15 cases. The water soluble scarlet red (Biebrich azo-benzine) is the form used for this treatment. In 1913 the scarlet red treatment was described, but good results were not obtained because of the non-availability of a preparation which could be properly emulsified.

The method of application is quite simple, the patient first douching or spraying the nose with a mild cleansing solution, and then a thick film of a 4 per cent scarlet red emulsion is applied to the entire nasal mucous membrane and at the same time massaged gently with the applicator. This treatment should be repeated every 48 hours.

Excellent results have been obtained, although the length of time under observation does not warrant final conclusions. (L. H. C.)

White, Leon E. **Accessory sinus blindness; differential diagnosis and operative technic.** Laryngoscope, Vol. XXXI, No. 8.

The author summarizes his article as follows:

1. A careful differential diagnosis should be made in every case, but in the subacute or chronic forms it is of the utmost importance to rule out central lesions and toxic infections.

2. While a certain proportion of cases recover either spontaneously or under treatment, permanent blindness may result in others unless they receive prompt surgical interference. The size and position of the middle and superior turbinates determine largely the question of recovery with or without operation, and when found to be blocking the ventilation to the posterior sinuses they should be removed.

3. The opening of the accessory sinuses for sudden loss of vision after the exclusion of other causes has been advocated by many investigators even with negative nasal findings. The fact that nothing is found either on inspecting the nose or by roentgenograms does not prove that there is no infection in the nose. It simply means that it can not be detected. If the loss of vision is due to the accessory sinuses, there is pathology, but it may be located so far within the nose as to escape detection. As the inflammation incident to this infection is frequently of the exudative but nonsuppurative type, the roentgenograms are practically negative. A more careful timing of the plates has shown a slight cloudiness in some, so there is hope that this bugbear of negative nasal findings will soon be eliminated.

4. The complete ethmoid exenteration is not only unnecessary, but actually contraindicated, unless there is sufficient pathology in the ethmoid labyrinth to warrant it, irrespective of the loss of vision. The semiradical sphenoid procedure which is advocated is one practically devoid of danger and can be performed under local anesthesia. It in no way impairs the function of the nose or needlessly imperils the life of the patient. It sufficiently ventilates and drains the regions adjacent to the optic nerve. Should, however, the visual disturbance be due to toxemia from other sinus, or from teeth or tonsils, these foci of infection should receive attention.

5. While it is well to emphasize the dangers of this or any operation in the hands of the unskilled, the fact is this sphenoid operation is frequently performed for much less serious complaints than the loss of vision. (L. H. C.)

NOTES AND COMMENT.

In the American Journal of Pharmacy for January, 1921, J. T. Lloyd, Ph. D., writes of the use of spiders in medicine. The spider remedies are not of modern origin. In old medical writings one finds frequent references to cobweb, which was generally administered in the form of pills. The modern homoeopathic school of physicians still employs an alcoholic preparation of cobweb under the name of Tela Araneæ and a tincture of the " whole spider."

The actual chemical constituents of cobweb is not known, but it gives a slight reaction to Mayer's test for alkaloid, and the therapeutic value of the homoeopathic preparation may be due in part to this constituent.

At least since the time of Pliny (first century A. D.) medical literature abounds in references to the use of spiders and their webs. The ideas of most of the old authors concerning the medicinal use of spiders may be gained from the following quotations which the author has gleaned from ancient writers:

" The fly-catching spider, wrapt in a line cloth and hanged on the left arm, is good to drive away a Quotidian, saith Trallianus (sixth century, A. D.). But better if any of them be boiled with oil of bay to the consistence of a liniment; if you anoint the arteries of the wrists, the arms, and temples before the fit, the fever abates and seldom comes again. *Koronides or Koranus* (King of Persia, who wrote a work on natural history): A spider bruised with a plaister and spread on a cloth and applied to the temples, cures a tertian. *Dioscorides* (first or second century, A. D.): The spider, called Lycos, put in a quill and hanged on the breast doth the same. *Pliny* (first century, A. D.): That house spider, that spins a thick fine and white web, shut up in a piece of leather or a nutshell and hanged to the arm or neck is thought to drive away the fits of a quartane. *Dioscorides* saith he proved it to be true. Three living spiders put into oil, let them presently boil on the fire, drop some of that oil warm into the ear that is in pain, and it profits much. Or press out the juice of spiders with juice of roses, and put it in with wool. *Marcellus Empiricus* (380–408 A. D., or later): Pliny bids infuse them in vinegar or oil of roses and stamp them and then drop some into the ear with saffron, and it will still the pain certainly: Dioscorides affirms as much. *Sofratus* * * * saith, that Crana-

colapsus (a certain spider) drowned in oil, is a present remedy against poisons, as the Scholiast of Nicander (second century, B. C.) professeth. Aetius (about 500 A. D.) for suffocation of the mothers, applied a cerate of spider to the navel, and said it did great good."

"*Spider Web.*—The spider's web is put into the unguent against Tetters, and applied to the swellings of the fundament; it consumes them without pain. *Marcellus Empiricus.* Pliny saith it cures runnings of the eyes, and laid on with oil, heals up wounds in the joints. Some rather use the ashes of the webs with Polonia and wine. Our chirurgians (surgeons) cure warts thus: They wrap a spider's ordinary web into the fashion of a ball, and laying it on the wart, they set it on fire, and so let it burn to ashes, by this means the wart is rooted out by the roots, and will never grow again. Marcellus Empiricus was wont to use the web of spiders found in the Cypress tree in a remedy for the gout to ease the pains.

"A few of the early writers, like Antoninus Pius, and more during the medieval period, used the web to stop the flow of blood. For this purpose it was also used by the American Indians, as well as in domestic practice, no doubt with a real value. For example:

"Antoninus Pius (86–161, A. D.) was wont to say that the quirks of sophistry were like to spiders' webs, that had a great deal of art and ingenuity in them but very little profit. But how often hath the blood run forth from the body most miserably by a fresh wound? Yet it had been easy to have stopped it by laying on a spider's web.

"*Telia Aranearum*, cobweb.—Everyone knows what this is, and how produced. It appears not in medicinal prescriptions, but as accident, for want of other helps, has taught its use to common people for stopping blood in a fresh wound. And this it seems to do by its extraordinary fineness; which makes it adhere to and stop up the mouths of the vessels, so as to prevent the effusion of their contents.

"*Arancarum Telae Pharm. Edinb.*, cobwebs.—These are applied by the common people for stopping the bleeding of wounds; which they effect not by any styptic power but by adhering to the part and closing the orifices of the vessels.

"The web astringes and conglutinates, and is, therefore, vulnerary; restrains bleedings, and prevents inflammation. The country people have a tradition that a small quantity of spider's web, given about an hour before the fit of an ague, and repeated immediately before it, is effectual in curing troublesome and sometimes obstinate distemper. This remedy is not confined to our own country, for I am well informed that the Indians about North Carolina have great dependence on this remedy for agues, to which they are much subject; and I am acquainted with a gentleman long resident in those parts who assures me he was himself cured by it of that distemper.

And, indeed, experience confirms the efficacy of this medicine in the cure of agues."

The modern use of cobweb dates from the publication in 1809 of an article by Dr. Robert Jackson, an English physician who advocated the use of spider web in the treatment of intermittent fevers. In 1865 Dr. L. M. Jones wrote of its use in allaying the spasm in bronchial asthma.

Commander George B. Trible, Medical Corps, United States Navy, who attended the post-graduate section of the meeting of the American Academy of Ophthalmology and Oto-laryngology held at Philadelphia, October 17–22, 1921, reports that the meetings of the academy were extremely interesting and instructive, the speakers embracing many of the most prominent men in their respective fields, and it was a highly appreciated privilege to be able to attend them. Many advances in this specialty were outlined and of these the great work presented by Prof. Van der Hoeve, of Holland, stands out preeminently.

The post-graduate section of the academy has been recently established and is worthy of continuance. A feature of the meetings of the greatest utility was the "round table," which was held at the Academy of Music on two afternoons, where luncheon was served and followed by short discussions of selected questions of general applicability by men who had devoted special attention to these subjects.

Arrangements have been made by the American Academy of Ophthalmology and Oto-laryngology with the Medical Department of the Army and the Army Medical Museum for the establishment of a museum or laboratory for special study and the collection of specimens of pathological tissues found in the practice of these specialties, and to further this end, Dr. Joseph Beck, of Chicago, has contributed the greater portion of his collection.

Lieut. G. D. Thompson, Medical Corps, United States Navy, who attended the fourth annual meeting of the American Dietetic Association held in Chicago, from the 24th to the 27th of October, 1921, reports that the dieto-theraphy sessions were taken up with impromptu talks and comparisons of dietetic methods in hospitals of various sections of the country in the treatment of nephritis, diabetes, pellagra, and tuberculosis. In the nephritic, low protein, salt free diet, the protein content used varied from 10 to 25 grams. The protein content is gradually increased to 40 grams as blood and urine analysis indicates. It was claimed that no anemia developed

from the 10–20 grams protein diet. The Newberg-Marsh high fat, low protein diet is being widely used in the treatment of diabetes. The education of diabetics and nephritics in food values and the preparation of food after their carbohydrate or protein tolerance is established, is being undertaken in many hospitals in order that they may be able to care for themselves in civil life.

Mr. John Street, of the National Canners' Association, emphasized the following points in a talk on canned foods:

(*a*) The duty and profit of the manufacturer in putting out safe food. The fact that manufacturers who do not cooperate with food officials in the production of pure food are barred by the canners from trade associations.

(*b*) That the popular prejudice against canned food, due to the tin can and to lack of selection of the product, has been largely eliminated.

(*c*) That ptomaine poisoning, formerly always laid to canned products, has been proven to be always caused by uncanned food.

(*d*) That much work is being done to eliminate botulism, the present popular dread in regard to canned food.

Dr. R. T. Woodyatt of the University of Chicago in an address on the dietetic management of diabetes, explained the reasonable basis for the Newberg-Marsh high fat and low protein diet. Since the fasting patient utilizes his own fat, and when no more is available his own protein, he may exhaust the tissues of organs to the point of dissolution before the sugar free point is reached. Ten per cent of fat by digestion is eventually reduced to glucose—the only sugar directly oxidizable in the body. On the other hand, 58 per cent of protein is finally reduced to glucose. By the high fat, low protein method, a diet is available which is sufficiently high in calories to protect the body tissues, and at the same time low enough in carbohydrate plus the glucose end product of digestion to be within the tolerance of most patients.

Dr. Sidney Kuh, of Chicago, in an address on the relationship between diet and nervous conditions emphasized the importance of great variety of foods and the necessity of their being well served, the psychic influence of foods being doubly important in abnormal individuals. The set routine in many hospitals of a certain food for each day soon becomes obnoxious to any patient. Idiosyncracies should be given more consideration than is necessary with normal individuals. Incidentally, Dr. Kuh condemned basal metabolism determination as a guide in the treatment of hyperthyroidism and advocated thyroidectomized serum as giving results in 80–90 per cent of cases.

Due largely to the language difficulty, we know little of Japanese medical affairs, although the names of several Japanese research workers are almost household words among us. In order that English-speaking people may keep in touch with Japanese medical progress, the Japan Medical World, a monthly medical journal, entirely in the English language, has appeared in Tokyo. In Japan there are to-day 22 medical colleges, all admirably equipped, in addition to special institutions for research, while the number of Japanese medical men is estimated at 45,000 out of a total population of 55,000,000.

We quote from the Lancet for August 20, 1921. "The men of the submarine service took great and mysterious risks on our behalf, and for their courage we hold them in honor. But in peace time they still have to face discomforts of which we know little. Perhaps the most persistent is the stuffiness of the boats, which is explained in a handbook for medical officers of submarine service, by Surg. Commander R. W. B. Hall, R. N., issued by the Admiralty. Stuffiness is due to the presence of the crew and to gases from the batteries and engines. The engines now blow the products of combustion straight overboard, so carbon monoxide is no longer a danger, and the specially susceptible white mouse, the original mascot of the service, and figured on its banners, is no longer its guardian angel. From the secondary batteries, while they are being charged, hydrogen is liberated, and, if in quantity, may cause explosion; also, if leakage occur or disaster, and seawater floods a battery, chlorine is given off, deadly in 1 part to 10,000. But the chief unavoidable impurities arise from the crew, products of respiration or perspiration, emanations from the body, clothing, or food, and tobacco smoke. The unpleasantnesses are due to heat, moisture, smell, loss of oxygen, increase of carbonic acid, and, rarely now, carbon monoxide. Arseniuretted hydrogen may be present from carelessness in the preparation and supply of the sulphuric acid and the lead used in the batteries.

"When a boat is on the surface she is ventilated through the conning tower, the hatches, and special air is drawn into her through all apertures by the suction of the engines, which discharge the used air overboard. During submersion no fresh air can be introduced, and at first reliance is placed on 16-inch traversing table fans, which keep the air of the compartments freely moving and mixing. After some 12 hours the inhabitants will begin to pant and the purifiers must be used to get rid of the increasing carbonic acid, the air being drawn constantly through trays of soda lime, renewed every four hours. The air then becomes unduly hot and moist and is passed

through coolers, which condense the moisture as snow. Generally there are two ventilation systems, one for the torpedo room and fore end and the other for the engine room and the after compartments, each with its own supply and exhaust trunks for use when the vessel is on the surface, and each helping the mixing of air when the vessel is submerged. The battery exhaust is of special importance when recharging is proceeding, and it can be separated entirely from the general ventilation of the boat. The water-closets have air exhausts to the engine induction system, useful on the surface; but the closets can be used when the vessel is not deeply submerged, for excreta are washed out of the pan by sea water admitted through a specially guarded inlet into a pressure-tight chamber, which is then closed to the pan, and the contents are blown into the sea by air pressure of 80 pounds or so. As to diseases, constipation is frequent, and dermatitis from petroleum; the risk of heatstroke to crews of submarines operating in the Tropics is great; eyestrain causes anxiety; it results from long spells at the periscope, but it is understood how needful it is that the observer shall be physically comfortable and have a good seat and a periscope that fits him and suits his sight. Eyestrain depends also in a small degree on the lighting of the boat, for the only light when submerged is electric. Lighting nowadays, to avoid glare, is indirect, the lamps being shielded by metal reflectors which disperse the light over the sides of the vessel painted a "matt" white; there is no enamel paint. Officers and men are very carefully selected physically, the ultimate responsibility apparently resting with the senior medical officer at Fort Blockhouse, the headquarters of the submarine service at Portsmouth. Men are not accepted who have suffered from tubercle, pleurisy, asthma, acute rheumatism, or syphilis. Extra and varied food is supplied."

The American consul at Calcutta reports that the foundation stone of the new School of Tropical Medicine at Calcutta was laid on February 24 by the Governor of Bengal. The Government of India provided $195,000 for the site and laboratory and is to contribute for the upkeep of the school. The institution is unique in the Tropics. The special work of the laboratory will be to investigate on practical lines the causes of tropical diseases in the Calcutta hospitals, with a view to finding more accurate methods of diagnosis and improved treatment. Tropical diseases cause over one-third of the deaths in Calcutta, and at least a large proportion in India as a whole, and the possibilities of carrying out practically important investigations of such diseases will be limited only by the amount of financial support afforded the new institution.

An appeal has been issued by the promoters of the institution for financial support and, because of the world-wide importance of such a school located on the spot where tropical diseases are ever present and the opportunities for research work as regards them unlimited, it is hoped that liberal subscriptions will be made by individuals everywhere. The institute will accept students from all over the world.

As a result of the expansion of the Medical Corps of the Army during the war, many different methods of handling syphilis have been introduced into the Army, some of which are not up to the standards already established in the Army before the war. In order to help reestablish more adequate uniformity of practice, the general rules which should govern the management of syphilis in the Army are emphasized again in the following summary which appeared in a recent issue of the Medico-Military Review.

Prevalence.—The present rate of infection of accepted applicants, as measured by a completely positive Wassermann reaction, is about 2 per cent, as contrasted with about 8 per cent of five years ago. This lower rate is probably due in part to the younger age of recruits and in part to prohibition and to social, moral, and medical prophylaxis. The rate for reenlistments is about 4 per cent, or double that for first enlistment, which is presumably due to increased age and to the fact that infected soldiers tend to remain in the service for the purpose of obtaining free and regular treatment. The general rate of infection in the Army, based on both clinical and serological evidence, is considered to be about 5 per cent.

Prevention.—Social and moral control of the individual should be emphasized as the best form of prevention. The point of view should be taken that the incontinent are injuring the family ideal which is the keystone of civilization, and that the infected have, by their selfishness or carelessness, put an extra load on the military organization. When exposure to infection occurs, in spite of the above considerations, compulsory medical prophylaxis is recognized as a valuable measure. Its success depends directly on early application following exposure and the technique used. Efforts should be made to place this measure on a high professional plane by maintaining a suitable room, adequate equipment, trained personnel, and complete records. Cooperation with the officers in command of the troops concerned is also necessary. For patients with open lesions an aseptic ward technique must be maintained. In the Army about 7 per cent of primary lesions are extra genital, some of which are innocent infections. This danger should be brought out in courses on personal hygiene.

Treatment.—The object of treatment should be, first, to lessen the danger of contagion, control symptoms, and thus keep men fit for duty as far as possible; second, in suitable cases, to attempt a definitive cure of the disease. In either case, the unit of treatment should be a course consisting of several intravenous injections of one of the arsphenamine series and intramuscular injections of mercury. The number of injections will depend on the requirements of the individual case.

(*a*) Arsphenamine group: Arsphenamine should be used when conditions are favorable for its proper administration, as it produces the most profound influence on the disease. Neoarsphenamine should be used when it is not feasible to give arsphenamine. On account of the ease of administration, neoarsphenamine is the most popular preparation, constituting over 90 per cent of this series of arsenicals produced in the United States. But it is eliminated from the body more rapidly than arsphenamine. The newer silver arsphenamine is possibly the most powerful and least toxic of the series, but it is not yet entirely out of the experimental stage, and for that reason this product will not be furnished by the Medical Department, while the older products are sufficiently satisfactory when properly used. The same can be said of sodium arsphenamine. Any arsphenamine products on sale in the United States have passed the Government toxicity tests and are fit for use. Arsenic preparations not of the arsphenamine group, such as sodium cacodylate, monarsone, etc., have no spirocheticidal action, and will not be used.

These preparations must be given only by officers who have had personal experience in the proper preparation and administration. It is intended that no officer shall graduate from the Army Medical School who does not understand the essentials of the technique. An examination of the patient must precede a course of treatment, especial attention being given to the renal and vascular systems. The first dose should be one-half of the maximum, and it should then be gradually raised, according to indications. If a serious or suspicious general or cutaneous reaction occurs in a given patient, subsequent injections should be given with caution or the arsenicals should be discontinued altogether and mercury alone used. Danger signals have been disregarded several times with disastrous results. Any case of fatality presumably due to treatment must be reported in full to the Surgeon General's office.

Technique.—Arsphenamine: Each ampule used should be inspected for the proper color and consistence of the powder and immersed in disinfectant solution for sterilization and the detection of cracks. Any product about which doubt arises at any stage of its preparation should be discarded. For preparation and dilution freshly dis-

tilled water should be used. For dissolving the product of the research laboratories of Philadelphia, hot water should be used, but for other products hot water is absolutely prohibited. To proceed, flame a file and make a cut in the neck of an intact, sterilized and dry ampule. Shake the contents onto the surface of about 50 c. c. of water in a sterile flask or bottle. Let it go completely into solution and do not expose to direct sunlight. The solution may be hastened by shaking. This acid solution must never be given intravenously. Several deaths have been recorded in the literature from this mistake. Normal or 4 per cent NaOH is now added until a flocculent precipitate forms and redissolves. Other strengths of NaOH are used, but normal solutions are standard. Theoretically 0.7–0.8 c. c. $\frac{N}{1}$ NaOH are required for each 0.1 gm. An excess of alkali is now added equal to one-fifth of the amount already added. For example, if to just alkalinize 0.6 gm. of arsphenamine, 4.5 c. c. of NaOH are required, add 0.9 c. c. more. This overalkalinization is important, as it is believed to prevent reactions due to a reprecipitate of the drug in the blood. Too great an excess of alkali, however, will produce thrombosis in the vein. The solution is now diluted with warm distilled water to 30 c. c. for each 0.1 gm. *This solution must not be shaken. Not more than ten doses should be prepared at one time and they should be given without delay.* A gravity apparatus should be used for administration. New tubing must be boiled and rinsed before use, as substances in it sometimes give rise to reactions. The apparatus should have a glass window near the point of attachment to the needle, and also a cotton plug in the bottom of the container for retaining undissolved particles, etc. The solution should be given at the rate of not more than 30 c. c. every two minutes. In brief, overalkalinize, dilute well, and inject slowly.

Neoarsphenamine should be given dissolved in 20 c. c. of distilled water at room temperature. It is more unstable than salvarsan and must be given as soon as prepared. At least five minutes should be allowed for its administration.

A solution of 1–1000 adrenalin should be on hand and 1 c. c. should be given subcutaneously in case of severe reactions occurring within a few hours. In some cases immediate reactions are due to adrenal insufficiency and can be controlled in this way.

(*b*) Mercury: The best way of giving mercury routinely is the intramuscular injection of 0.6–1.2 c. c. (1–2 grains) of a 10 per cent suspension of mercuric salicylate in liquid petrolatum. It acts longer than the soluble salts, but is not encysted in the tissues like grey oil. The use of inunctions or soluble preparations is optional, but the intramuscular injection of the salicylate is considered standard.

(*c*) Potassium iodide: This drug has a definite place in the treatment of late cases, but as the principal object of this summary is to deal with early cases, the use of this drug will not be discussed.

Cure.—In suitable cases an attempt should be made to produce a radical cure by an intensive course of treatment. The earlier the case is treated the better is the chance of cure. Hence, bacteriological or serological diagnosis of the primary lesion is necessary. Only men whose general condition is good should be placed on this treatment. For others the chronic intermittent treatment should be used. On account of difficulty of following patients and the inadequacy of the earlier treatments no large and convincing series of cures with exact amounts of treatment have been recorded in this country. Some of the most suggestive work has been done in the English Army. The following outline represents the minimum of treatment that may be expected to cure:

(*a*) Primary stage: *Treponema pallidum* present, Wassermann reaction negative. A course of six weekly injections of one of the arsphenamine series, together with a course of twelve weekly injections of mercury. Observation with monthly Wassermann reactions for one year without further treatment, if there are no evidences of relapse. At the end of the year, clinical, spinal fluid and blood examination with provocative Wassermann test. If a patient under this follow-up system has a serological or clinical relapse, the case should be counted as a failure of cure and should be put on chronic intermittent treatment.

(*b*) Primary stage: *T. pallidum* present, Wassermann reaction positive. One course of treatment as given above, followed by a rest for one month and then a complete second course. Observation as given above.

(*c*) Secondary stage and later stages: Four courses of treatment as outlined above, with rest of one to three months, according to indications. Observation as given above.

With the onset of winter the Medical Department of the Army undertook an investigation on a large scale of prophylactic vaccination for the prevention of pneumonia and other respiratory diseases in the Army. For several years efforts have been made by medical officers of the Army and by medical men throughout the world to develop a prophylactic vaccine which would reduce the incidence and death rates from pneumonia. A saline pneumococcus vaccine was tried out at Camp Upton in 1917, and a lipo-pneumococcus vaccine was used later in this country and in France, but the results obtained were not conclusive on account of military operations and the epidemic of influenza.

During the fall of 1920, several thousands of prophylactic inoculations were administered with rather gratifying, although not conclusive, results.

This year in order to afford, if possible, protection against a number of the respiratory diseases a change has been made in the vaccine. Type III pneumococcus has been omitted because Type III pneumonias are very rare. Two of the most prevalent types of streptococci (Dochez and Avery) have been added and also the influenza bacillus because it acts as a pathogen for the respiratory tract, regardless of whether or not it is the cause of influenza.

The plan this year aims to secure accurate data under the personal supervision of a specially trained medical officer at the three division camps and at Fort Myer. The work requires controls, careful records, adequate laboratory service, and much personal attention on the part of medical officers serving with the troops. It is to be carried out as a voluntary measure on the part of the soldier.

It is expected that whole battalions will be vaccinated while other battalions unvaccinated will serve as controls. The outcome of this investigation will be of interest to medical officers of the Navy and will be reported as soon as the information is available.

NURSE CORPS.

The statement has been made frequently that nurses are not progressive. Having completed the course required to secure her diploma which entitles her to practice, the nurse, it is stated, believes that her graduation constitutes the Alpha and Omega of her calling. Granted that this attitude may be individual rather than general, every effort should be made to combat the statement. To preach or point out the path of duty is never pleasant, but this responsibility is part of the price of a position which includes supervision of the individual or group.

The Bureau of Medicine and Surgery recognizes the fact that the varied duties of a nurse in the Navy may have a tendency to institutionalize her unless she be alert to this possibility, and by her own attitude and endeavor she overcomes the temptation to be content with the qualifications which make her present work acceptable. With the desire to encourage those who wish to acquire broader experience in certain branches of their calling, the Surgeon General is endeavoring to work out certain plans which will give this benefit to the nurses who show the necessary aptitude and ambition.

Just how this will work out cannot definitely be stated, since the perfection of the plan must depend upon its relation to the Navy Department as well as to hospital administration and the individual. The number to benefit by these plans must be limited in the beginning. It would appear, however, that courses in laboratory work, anæsthesia, and dietetics may be arranged. A hopeful preliminary of the Surgeon General's desire was his recommendation that two nurses be sent to Oteen, North Carolina, in response to the invitation from the Surgeon General of the U. S. Public Health Service that there be a representative from the Navy Nurse Corps for the course in treatment of tuberculosis. In the near future, it is expected that this attitude of the Bureau may be on a firm foundation, the development to be attained by the attitude, aptitude, and desire for further instruction indicated by the nurses.

Nurses will be interested in the completion of a new hospital on Fifth Avenue in New York which is unique in construction and, if the present plans materialize, will be unique in its management. The

open ward, cited by Dr. Hugh Cabot of the University of Michigan as "a psychic insult to the patient," has been abolished. Every room is to be an outside room and each patient will have a room to himself and also a bath, while the rates are to be based on the patient's ability to pay. The entire floor which is set apart for the care of children, from newborn infant to the boy or girl of 15 years, has glass partitions which will preserve the necessary isolation, yet will permit a patient the amusement of seeing other children. A playroom also forms a part of the complement of this floor.

In view of the difficulty to be met in securing sufficient graduate nurses to meet the present demands, one may wonder where the necessary nurse personnel will be found to give adequate care to patients in this large hospital of private rooms.

The fact that our former Surgeon General, Rear Admiral William C. Braisted, is now president of the College of Pharmacy of Philadelphia may be an incentive to nurses to have a greater interest in the use of drugs in the treatment of disease. The surgical nurse has apparently occupied a more noticeable position than the general or medical nurse. It is possible there may be a tendency to revert to the use of drugs in treatment of disease and the nurse should be alive to this tendency if she would intelligently follow the directions of the doctor.

The Journal of the American Medical Association of October 8, 1921, contains two interesting articles on the "Value of Drugs," the general terms of which may be understood by the nurse. The warning sounded by Dr. Henry Christian, of Boston, is intended for doctors, but the following may be a warning to the nurse who is inclined to forget the ethics of her calling in so far as to recommend to patient or friend relief for some ill that flesh is heir to. Dr. Christian says "Be wary of the words of the itinerant drug vender and of the literature flooded in on you by drug houses."

DIGEST OF DECISIONS.

LEAVE—NAVY NURSE CORPS.

The decision of the Judge Advocate General dated March 9, 1921 (File 26477–101, C. M. O. No. 4, 1921), was reconsidered and affirmed. Nurses in the Naval Reserve Force were discharged therefrom and immediately appointed in the Navy Nurse Corps in each case for the reason that there was no provision of law which authorized the department to transfer them to the Regular Navy Nurse Corps, except by a discharge from the former and an appointment in the latter. When persons in the naval service, whether in the Naval Reserve Force or in the Regular Navy, are discharged they surrender all the benefits which have accrued to them in that service, unless the law specifically provides that, upon reappointment in that or some other branch of the service, they may carry such benefits with them. Upon their discharge from the Reserve Force all rights to leave theretofore acquired lapsed, i. e., they were no longer in a position to receive leave of absence accrued with pay. In the absence of any provision of law authorizing them as members of the Navy Nurse Corps to receive the leave which they had previously earned as nurses in the Naval Reserve Force, said leave can not be granted. (File 26477, 101 : 1, Sec. Nav., June 9, 1921.)

LINE OF DUTY AND MISCONDUCT CONSTRUED.

An enlisted man of the Navy became insane after serving in the Navy for more than three years. The diagnosis was "dementia praecox" and the various boards of medical survey which examined him agreed that a predisposition existed to this disease prior to his enlistment. He received two medical examinations upon entering the service, one on his first enlistment and another upon his reenlistment, besides being under medical observation throughout the entire period. There was no definite evidence adduced which would show that he had a predisposition toward dementia praecox throughout this period.

The Judge Advocate General held that the disease from which this man is now suffering was incurred in line of duty. (File 7657–390 : 40, J. A. G., May 19, 1921.)

LINE OF DUTY AND MISCONDUCT CONSTRUED.

An enlisted man of the Navy, while on authorized liberty at Liverpool, England, was struck on the head by an unknown assailant as he descended from a street car. It appeared that he was not intoxicated and that the assault was wholly unprovoked. He was discharged from the naval service for physical disability as the result of the injury received.

The Judge Advocate General held that this man received his physical disability in line of duty. (File 7657–640 : 1, J. A. G., July 1, 1921.)

LINE OF DUTY AND MISCONDUCT.

Facts: An enlisted man, while on authorized liberty from his ship, accidentally walked off the dock near drawbridge at Salina Cruz, Mexico, and was drowned. No evidence whatever to indicate deceased was intoxicated or otherwise incapable of taking proper care of himself when he met his death, the facts of the record affirmatively showing that there was no intervening cause for which enlisted man could be held responsible for his death.

Held: That death was the result of an incident of the service, was incurred in the line of duty, and was not the result of any misconduct on the part of the deceased. (File 8322–447: 1, J. A. G., July 28, 1921.)

MEDICAL TREATMENT WHILE ON LEAVE OR FURLOUGH.

The decision of the Judge Advocate General dated 29 June, 1921 (File 6757–390: 39), holds that an enlisted man of the Navy is not entitled to medical treatment in a civil hospital by a civilian physician at public expense while on leave of absence or furlough or extended leave of absence or furlough.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department.
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.

"For the general practitioner a well-used library is one of the few correctives of premature senility which is apt to overtake him."

DISEASES OF THE EYE, by *George E. de Schweinitz, M. D., LL.D., professor of Ophthalmology in the University of Pennsylvania.* Ninth edition. W. B Saunders Co., Philadelphia, Pa., 1921.

When a new edition of a work that has been a standard followed by students and practitioners for thirty years, and that has passed through eight editions, appears, it needs little attention on the part of the reviewer. The ninth edition of de Schweinitz's "Diseases of the Eye" has been issued by W. B. Saunders Co., and on reading the volume one is struck by the number of important ophthalmic observations, therapeutic measures and surgical procedures which have been made, recommended, and devised during the last four years and which has made necessary the revision of this well-known book. (W. M. K.)

ESSAYS ON SURGICAL SUBJECTS, by *Sir Berkeley Moynihan, K. C. M. S., C. B.* W. B. Saunders Co., Philadelphia, 1921.

This book contains nine essays written by Sir Berkeley Moynihan, of Leeds, England, and published during the last few years. The first of the collection is the Murphy Memorial Oration which Dr. Moynihan delivered before the American College of Surgeons at Montreal, October 11, 1920. In it he pays a glowing tribute to Dr. J. B. Murphy, who was beyond question the greatest clinical teacher of his day. He briefly reviews some of the main features of the progress of surgery as a science and art and tells the tale of some of

the great men who have labored in it, from the earliest days up to the present time, in order that we may see Murphy's place in medical history; and he closes the oration with these lines: "As we look backward upon the long history of the science and art of medicine we seem to see a great procession of famous and heroic figures, each one standing not only as a witness of his own authentic achievements, but also a symbol of the traditions, ideals, and aims of the age which he adorns. The procession is sometimes thinly stretched out, or even widely broken here and there, but in happier ages it is thronged by an eager and exultant crowd. In medicine the whole pageant is as noble and splendid as in any of the sciences or arts, and it reveals the collective and continuous genius of a band of men inspired by the loftiest purpose, and lavish in labour and sacrifice for the welfare of mankind. They have come throughout the ages from every land. They now belong not to one country but to every country, for they are the common possession and the pride of all the world. They have lost their nationality in death. They are men whose deeds will not be forgotten and whose names will live to all generations. Among such men, few in number, supreme in achievement, John Benjamin Murphy is worthy to take his place."

The "Ritual of a surgical operation," "The diagnosis and treatment of chronic gastric ulcer," "Disappointments after gastroenterostomy," "Intestinal stasis," "Acute emergencies of abdominal disease," "The gifts of surgery to medicine," and "The surgery of the chest in relation to retained projectiles" are the titles of essays in the collection which, as the author says, present a consecutive strain of thought and experience for final judgment and which present the author's views covering a large field of surgery.

The volume closes with an address on "The most gentle profession," delivered to the nurses of the Leeds General Infirmary, January 21, 1921, in which the author says: "The true rewards of honest work are neither to be seen nor handled. They are not measured by a gold standard nor by any material result. They are not acclaimed by the applause of the crowd. They lie within you, in your own knowledge that you have done your best, that you have striven to reach your own standard of your highest powers. You will often, perhaps always, fail to reach your own ideal: but be comforted. Ideals are not for attainment, but for pursuit."

This collection of essays may well take its place on the doctor's book-shelf beside Camac's "Epoch-making contributions" and "The councils and ideals of William Osler." (W. M. K.)

The Spleen and Some of its Diseases by *Sir Berkeley Moynihan*. W. B Saunders Co., Philadelphia, Pa., 1921.

In this book Sir Berkeley Moynihan has published in permanent form his Bradshaw Lecture delivered at the Royal College of Sur

geons of England in December, 1920. The volume is a lucid and learned discussion of a subject which has given rise to much speculation as well as experimental work. In fourteen chapters he deals with the anatomy, surgery, functions, and pathology of the spleen, the clinical and associated phenomena in splenic disease, pernicious anemia, lukemia, Hodgkins disease, splenic anemia, hemolytic jaundice, Gaucher's disease, von Jaksch's disease, polycythemia, differential diagnosis, the liver in some of its relations to the spleen and his conclusions. The monograph is an admirable summary of modern ideas on a subject of increasing importance. One notes the absence of a chapter on the technic of splenectomy, but as there has been no essential change in the technic in recent years, the inclusion of such a chapter would have been only for ready reference.

In concluding his discussion, Sir Berkeley says: "It is through the correct insight into the significance of the clinical symptoms and other morbid phenomena that the real understanding of any supposed case of splenic disease becomes possible. Instead of searching only for the existence of this or that splenic disease, *an inquiry should be directed to the determination of the functional capacity of all the various organs* likely to be deranged. The symptoms already referred to may be looked upon as evidence of some disorder in the particular *systems* here considered. This derangement must be regarded not merely as a restriction of the morbid changes to the spleen, but as a disturbance of wide ramification throughout the whole body, affecting one or other, or perhaps even all, of the four systems in which the spleen plays a part. The focus, at the moment, may in truth be in the pulp of the spleen; but even so, the general picture presented by the patient is the outcome of the participation of the other systems in the process which started in the spleen. It may be that splenectomy in any of these diseases will remove the obvious culmination of the morbid process, and thus bring about a 'cure' of the disease or an arrest of its development; but it does not by any means follow that all the other related parts are thereby caused to return to their normal states. Absence of symptoms does not imply the restitution of normal functions."

"A further step in the investigation of the clinical condition of the patient should aim at the exact discovery of the *site* of the lesion in certain particular cell types: (*a*) In the spleen pulp; (*b*) In the bone marrow and in any part where the reticulo-endothelial cells may exist in specially congregated or active masses; (*c*) In the liver; (*d*) In the endocrine organs, including the pancreas. This lesion being predicted, or recognized, the question will arise as to whether it consists in, or entails, the elaboration of poisons capable of causing haemolysis, cirrhosis, or asthenia.

"The tissue affected, and the changes therein resulting, being recognized, further research must be directed to the discovery of the type of ineffective agent at work, whether bacillary, spirochaetal, or other. In other words, the patient is no longer to be regarded merely as the victim of some type of 'disease,' but as the victim of disorders of a certain character in certain parts of certain anatomical or functional systems of the body. It is the form of the disorder, the form of distribution (determined by an assessment of the functional capacity of the several organs concerned or likely to be concerned), which, when correctly studied, will inevitably lead to the source and cause of the morbid state, and ultimately to the prospect of the 'cure' of the patient." (W. M. K.)

THE RIVIERA OF THE CORNICHE ROAD, by *Sir Frederick Treves, Bart., G. C. V. O., C. B., LL. D., Sergeant Surgeon to His Majesty the King.* Funk and Wagnalls Company, New York, 1921.

If you have ever left your ship at Villefranche and climbed up the footpath which winds through the olive groves to the great road which runs from Nice eastwards towards Italy, you will be delighted with Sir Frederick Treves' latest book which deals with *Le Chemin de la Grande Corniche* and the country through which it winds and the little towns which bask in the sunshine of the Riviera.

La Grande Corniche is without doubt the best known and the most popular road in Europe. It starts from Nice, but as Sir Frederick relates, long before Mentone is in sight it drops into quite a common highway, and thus incontinently ends. It is not even the shortest way from point to point, being, on the contrary, the longest. In so far as it evades all towns it is unlike the usual great highways. It passes through no cobbled, wandering street; breaks into no quiet, fountained square; crosses no market place alive with chattering folk; receives no blessing from the shadow of a church.

Nowhere is its coming heralded by an avenue of obsequious trees, it forces its way through no vaulted gateway, it lingers by no village green, it knows not the scent of a garden nor the luscious green of a cultivated field. It was built by the French under Napoleon I in 1806. It was constructed to carry arms and men, guns and munitions and the implements of war into Italy and beyond.

The road is cut out, as a mere thread, upon the side of a mountain range which is thrown into many folds. It is never monotonous, never, indeed, even straight. It winds in and out of many a valley, it skirts many a fearful gorge, it clings to the flank of many a treacherous slope. Here it creeps beneath a jutting crag, there it mounts in the sunlight over a radiant hill or dips into the silence of a rocky glen.

From it the wayfarer looks down upon a scene of amazing enchantment, upon the foundations of the everlasting hills, upon a sea glistening like opal, upon a coast with every fantastic variation of crag and cliff, of rounded bay and sparkling beach, of wooded glen and fern-decked, murmuring brook. From it one sees bright villas by the water's edge, a white road that wanders as aimlessly along as a dreaming child, a town or two and a broad harbor lined with trees. Far away are two daring capes, two little islands, and a line of hills so faint as to be almost unreal, and often enough the ghostly island of Corsica lying on the sea like a lilac cloud. Inland one has occasional glimpses of the Maritime Alps, peak after peak, deep in snow.

The road passes through a land which is a Vanity Fair to the frivolous, a paradise to the philanderer, and a garden of peace to all who would escape the turmoil of the world. It is a lazy, careless country free from obtrusive evidence of toil and labor, for there are no factories within its confines and the voice of the agitator is not heard.

It is very old country. It can claim a lineage so ancient that the first stirrings of human life among its rocks would appear to the historian as a mere speck in the dark hollow of the unknown. Through this country in by-gone times wandered the shrewd Phoenician searching for something to barter, and later the staid, soldierly Roman seeking for whatever would advance the glory of his imperial city; and then the hectoring Lombard, the swarthy Moor and the Saracen, a restless band of robber barons and pirate chiefs, a medley of mediæval men at arms and a cluster of lords and ladies with their suits; later still the soldiers of Savoy and the troopers of Napoleon.

As Sir Frederick rambles with his reader through this land he tells him tale after tale of men and women who lived long ago in the old towns which perch upon the hilltops between Grasse and Mentone—tales of love and hate, of war and conquest, of intrigue and betrayal, of murder and sudden death.

He pokes into odd nooks and corners of such old towns as Eze, Monaco, Roquebrune, and Sospel, and he reveals the charm and beauty of the Riviera so delightfully that when the last page is reached the reader is sorry that he has come to the end. W. M. K.

QUERIES.

Medical officers are invited to submit queries and to present their problems to the Bulletin, which, being in a position to draw on varied and extensive sources of information, such as are not available elsewhere, will use every means of securing authoritative opinion.

All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

To the Editor: I should like to have some information concerning the consensus of opinion regarding the use of stock or polyvalent vaccines, as there seems to be great diversity of belief among medical officers with whom I have talked about this subject.

P. B. P.,
U. S. S. ———.

1. From the consideration of literature on the subject of vaccine therapy it is evident that confusing and contradictory reports as to their efficacy are the rule. The reports of uniform good results are usually from poorly controlled observations, and comments by specially qualified observers tend to be very skeptical of such results. This is particularly true of streptococcic vaccines. "The varieties are so numerous and differ in their immunological peculiarities to such an extent that there is nothing to say in favor of a polyvalent vaccine, supposed to be active against all types. In multiplying the strain the quantity of each becomes so reduced that the essential one, if present, is in such small amount as to be without therapeutic effect. *Streptococcic vaccines should always be autogenous.* They are contraindicated in acute and general infection. In subacute and chronic local infection due to streptococci, *autogenous* vaccines, given subcutaneously, sometimes act very favorably." (G. H. Weaver.)

2. "It can be stated definitely that gonorrheal vaccine or any of its modifications is utterly useless in the treatment of acute or chronic gonorrheal urethritis. The occasional *symptomatic* relief in epididymitis and arthritis is not the result of specific action (due to foreign protein), and the benefit derived is not proportional to the risk involved." (J. T. Geraghty.)

3. "The staphylococcus vaccine in acne vulgaris is of little, if any, value. The same may also be said of the staphylococcus part of a mixed acne bacillus and staphylococcus vaccine. The specific effect

of acne bacillus suspensions (vaccines) is best seen in types of acne, in which the lesions lie deeper in the cutis. These vaccines have less effect on the more superficial types known as acne simplex and acne pustulosa." (M. F. Engman.)

4. Certain definite conclusions may be drawn and applied to the use of vaccine in the naval service. Vaccine treatment should never be instituted unless the causative element is definitely established by bacteriologic study, and then only in a limited number of cases, as all organisms do not produce the same type of response in the human body, the great majority not stimulating the production of any curative antibodies. If the facilities are available for a bacteriologic diagnosis, the same equipment will usually permit the preparation of an autogenous vaccine, if a vaccine is really needed or indicated.

As our knowledge of immunological relationship of organisms to disease increases, the use of stock vaccines, particularly of mixed varieties, becomes more and more like the old "shot-gun" prescriptions, given with the hope that something might work. To give a mixed vaccine in treating an infection due to one organism has no scientific justification.

Stock staphylococcus vaccine should have no application. Autogenous staphylococcus vaccines, if prepared, are rarely productive of results, and such results as follow their use are very often coincident, rather than a direct result of the vaccine.

Streptococcic vaccines should always be autogenous. They should never be used in acute infections, and their application is limited to a few localized subacute or chronic infections and only occasionally give good results here.

In acne vulgaris of the deep-seated, indurated type, acne bacillus vaccine occasionally gives good results, and because of difficulties of cultivation, autogenous vaccines are not always practicable, and stock vaccines may be used. Before using the vaccine the presence of the organism should be demonstrated.

To sum up, it would seem that with the possible exception of pure acne bacillus vaccine, no stock vaccines, in the light of our present knowledge, should be used. As to the colon bacillus vaccine the best available opinion is that it is of little or no value, even in colon pyelitis, the condition in which it was for a long time thought to produce good results. (C. S. Butler.)

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

SANITARY SURVEY OF SHIPS.

Without compass, sextant, charts, or navigational tables, it would be practically impossible for the navigator of a ship to fix his position at sea; likewise, when entering a port he has to rely upon charts of the channel, which are constantly being changed, but before any such changes are made the channels are carefully surveyed and the results of such surveys are sent broadcast to all mariners. If the navigator did not keep himself informed of such changes, he might unnecessarily hazard his ship. As with the navigator of a ship, the health officer, ashore or afloat, must have up-to-date charts and scientific instruments with which to carry on his work.

The health officer of a state or city, who at first had no systematic method of recording his sanitary data, soon learned that it was necessary to place such information gained from inspections in an intelligible form. From the civil engineer he found that the most convenient method of keeping such data would be to go into the field and with the aid of his sight, nose, and scientific instruments to gather such information and to return to his office and transfer and plot his data on maps and diagrams.

The medical officer should not rely upon his memory in carrying out his duties as health officer of a ship, but as with the navigator, should depend upon charts and tables, as well as scientific instruments applicable to his purpose. Unless such charts are kept up to date they will be of little assistance to the medical officer. In addition, they must be readily available for reference.

The naval medical officer has a distinct advantage over the civilian health officer inasmuch as the population for whose health he is responsible is composed of men between the ages of 18 and 65 years, the vast majority being between the ages of 18 and 25 years. In addition, the crew of a ship is under strict military discipline and can be made to obey all regulations promulgated for the prevention and control of disease. Another great advantage the medical officer of a ship has over the civilian health officer is that all men of a modern man-of-war are select physical specimens and are at all times kept in the highest state of physical vigor. On the other hand, there are

certain disadvantages to which the naval medical officer is subjected. His men are living under unnatural conditions—their movements are limited and they are much overcrowded as compared with any civilian community, even in the most densely populated areas of a large city.

We must sooner or later conclude that it is as necessary for a ship to have a well-organized and functioning health department as it is for a city, town, or other civilian community. It has been our tendency in the past to rely too much upon curative measures and, possibly to some extent, upon the control of disease after it has once occurred, instead of making every endeavor to prevent its introduction among the personnel. The keynote to all preventive medicine problems is to prevent the introduction of disease and after it has once appeared to ferret out the avenues of invasion in order that a second occurrence of this disease, or other diseases which are transmitted in like manner, may be prevented.

Herein lies the particular value of sanitary surveys which promotes a thorough familiarity with all parts of the ship and provides a record of past as well as current hygienic, sanitary, and epidemiological facts. It is confidently believed that few medical officers take the time, or exercise the initiative, to trace each communicable disease to its source and to record each case in such a manner that the originator of the epidemic, whether large or small, may be graphically and plainly demonstrated.

The term *sanitary survey* seems to be appropriate when applied to the purpose of obtaining a full knowledge of the sanitary conditions of a ship through inspections. When an attempt is made to define just how such surveys should be made for various classes of ships, it is rather difficult to give a plan which is applicable to all. In this connection it might be stated that the average medical officer looks upon such work as a complex and onerous procedure, principally because he goes at it with the idea of making it entirely too comprehensive, whereas the simpler such surveys are made the more serviceable they will be.

Briefly stated, a sanitary survey should comprise a general examination of all matters pertaining to the health, cleanliness, and comfort of the crew, and the reduction of the information thus gained to systematic and classified records by means of maps, charts, tables, etc. Most medical officers already make regular inspections (sanitary surveys) to familiarize themselves with the exact physical conditions of the ship from a sanitary viewpoint, but few use this information to the best advantage inasmuch as practically none keep records or graphic charts for future reference. From this it will be seen that the only additional work required of the medical officer is to present data collected during such inspections to the Chief Pharmacist's Mate for compilation in graphic form.

The work of making a sanitary survey of a ship may be conveniently classified under the following headings:

1. Communicable diseases.
2. Accidents, injuries and poisonings.
3. Sanitary condition of living compartments, storerooms, "heads", bathrooms, galleys, bakeries, sculleries, etc.
4. Messing arrangements and food.
5. Ventilation.
6. Water supply.
7. Sewage and refuse disposal.

COMMUNICABLE DISEASES.

The survey under this heading should comprise the acquirement of statistics on each of the more common communicable diseases, such as tonsillitis, acute respiratory infections (catarrhal conditions of the upper respiratory tract), measles, mumps, scarlet fever, diphtheria, venereal disease, malaria, etc. and the recording of this data in such a manner that they will be of use for future reference. Each ship should have its statistics in as intelligible a form as those kept for the entire Navy in the Bureau of Medicine and Surgery.

It is suggested that a scheme somewhat similar to the one given below be used. Each communicable disease should be designated by a color or symbol; for instance mumps, green; measles, blue; tonsillitis, black; etc. Now, for example, when a case of tonsillitis is admitted the patient should be questioned as to the compartment in which he sleeps, at which mess table he eats, and in which division he works. This information should be charted, using the color designating the disease; in this case, black.

In order to show from which compartment the disease may have originated it would be of value to spot each new case of the disease in the compartment in which the patient is berthed. This may be done by having a chart made of each deck on which men are billeted and spotting the disease in appropriate symbols in the proper compartment. This may be better illustrated by the following chart:

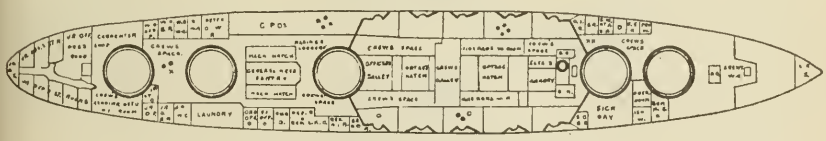


Chart of deck for spotting compartments in which disease may have originated.

All other communicable diseases occurring during the year should be recorded in a similar way. At the end of the year the chart should be filed for future reference and a new one prepared.

Inasmuch as mess gear is an epidemiological factor to be considered in the study of the spread of disease, it is important to ascertain at

which mess table the patient is assigned. This, too, may be recorded graphically by the use of strip charts, which offer a simple method

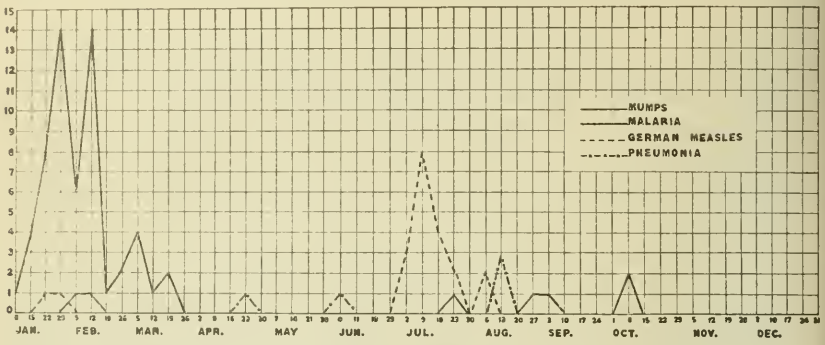


Chart showing incidence of disease throughout the year.

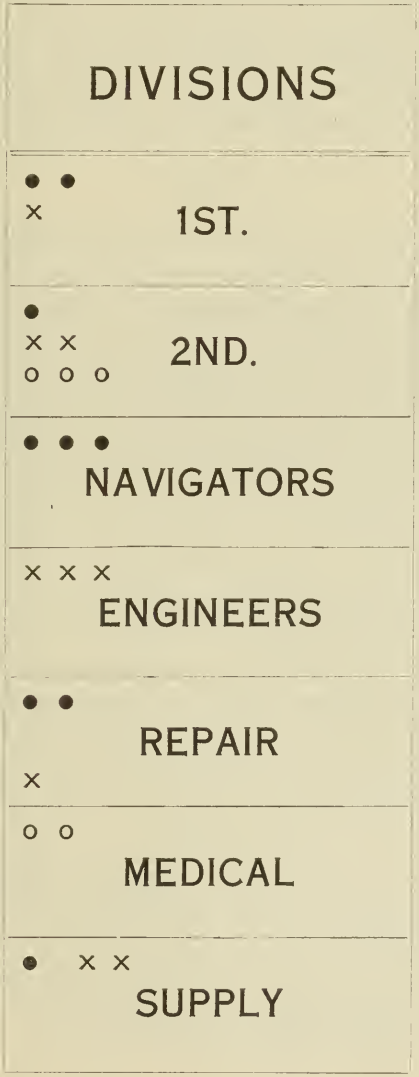
of exhibiting statistical data. The same case which was spotted in the compartment should be recorded here also. To show how such a chart may be prepared the following example is given:

MESS TABLES	
● ● ● × o	NO. 1
● × × ×	NO. 2
× × × o o	NO. 3
● ● ● ●	NO. 4
● ● ×	NO. 5

It will be noted that each mess table is represented by a segment of this strip. The mess tables should be numbered in accordance

with the numbers assigned to the various messes by the Executive Officer. These charts should also be filed at the end of the year and new ones prepared at the beginning of the new year.

It is also important to know in which division the greatest number of cases of communicable diseases occur and what diseases are most prevalent in the various divisions. In the preparation of the chart for the divisions the same color scheme or system of symbols should be used as previously described. As an illustration, tonsillitis could be spotted on the chart given below in black:



In order to determine the seasonal prevalence of any communicable disease, each such disease should be recorded in color, or by suitably designated lines, on arithmetical charts, the abscissae of which are divided into weeks. Inasmuch as it would be difficult to show the various communicable diseases in rates per 1,000 on one chart, it seems advisable that the ordinates represent the actual number of cases of each disease. An example of this type of chart is given below:

This method of tabulation and recording of disease conditions existing aboard ship will be of inestimable value to the medical officer in his efforts along the lines of preventive medicine. Furthermore, a graphic exposition of the facts will be a strong argument with which to gain the cooperation and support of the commanding officer in all measures relating to the prevention and control of disease.

ACCIDENTS.

Generally speaking, preventive measures against accidents have been grossly neglected. It is believed that if the place of occurrence of each accident were recorded and this data more carefully studied, that more intelligent preventive measures could be instituted against accidents than are now commonly employed. A convenient means of recording accidents would be to spot them with some suitable symbol. entirely different from those employed for the communicable diseases, on the same chart used for spotting communicable diseases.

SANITARY CONDITION OF LIVING COMPARTMENTS, ETC.

Just how detailed the medical officer's sanitary inspection of living compartments, storerooms, "heads," galleys, sculleries, etc. should be and what sanitary standards he should require are questions difficult to answer with definiteness. It is felt that the medical officer should allow considerable latitude in regard to such matters. He should not insist upon the enforcement of sanitary regulations which are not practicable, although they may be the ideal, but he should demand that all measures which have a true and direct bearing upon health be instituted as soon as possible.

The medical officer, of course, should keep a record of all such inspections. For this purpose the records may well be kept in the form of a permanent score card, which could not only be used as an adjunct in the study of the epidemiological factors considered previously, but also serve as a check upon sanitary conditions existing from week to week. For this purpose such a score card as is indicated below may be used:

Score Card.

	Jan. 1.	Jan. 7.	Jan. 14.	Jan. 21.	Jan. 28.
Officer compartments					
C. P. O. compartments					
1st Div. compartments					
2d Div. compartments					
Fireman compartments					
Engineer compartments					
Officer toilet					
Officer bath					
C. P. O. toilet					
C. P. O. bath					
Crew "heads"					
Crew workroom					
Galley					
Bakery					
Etc					

3.5 to 4, excellent.
3 to 3.5, very good.
2.5 to 3, good.
2 to 2.5, fair.
1 to 2, poor.

Since the construction of individual ships vary so widely it is impossible to prepare a single score card which would be applicable to all. However, the outline given above, which is incomplete in many details, will serve as a guide in the preparation of score cards for the various ships. The medical officer during his inspection should have a rough score card, which could easily be prepared in the print shop, on which he could record the results of his inspection while fresh in his mind. Such data should then be transcribed to the permanent score card kept in the sick bay.

MESSING ARRANGEMENTS AND FOOD.

The medical officer should exercise great care in the supervision of the preparation and service of food and the cleanliness of the mess gear. An excellent mess routine was used aboard the U. S. S. *North Dakota*, and since this proved to be most effectual it is thought that such a scheme might well be inaugurated on all ships.

The following rules for the management of the details of messing as adopted on that ship are quoted herewith:

"The system in use aboard the U. S. S. *North Dakota* for quick, efficient service of the crew's messes and for cleanliness of messing material and messing, consists in using the scullery as a central control station. The personnel in charge of the scullery are men trained to a love of duty, order, and cleanliness. They are held accountable for the care and upkeep of the scullery, and are ulti-

mately responsible for the cleanliness and sterilization of every piece of mess gear received in the scullery.

"The master-at-arms attached to the scullery supervises the conduct and appearance of all messmen at all times. He is responsible for the strict enforcement of the following ship's regulations:

"The scullery men are instructed to refuse mess gear to messmen whose prescribed uniforms are dirty. The uniform for messmen is clean white undress with clean aprons. In hot weather, the uniform may be changed by the executive officer to clean undershirts, white trousers, and clean aprons.

"Scullery men are forbidden to accept from or to give mess gear to any person other than a duly authorized messman, nor shall he accept any rack of dishes which does not contain the allotted number of dishes for that mess. Scullery men shall only accept mess-gear racks containing a deficient number of dishes after having reported the facts to the master-at-arms attached to the scullery, who shall note the facts and investigate.

"Admission to the scullery is forbidden to all persons except scullery men, the master-at-arms, and the officer in charge. The head scullery man shall at a reasonable time after each meal check all mess gear in the scullery and report to the master-at-arms any messman's failure to bring racks to the scullery on time. The master-at-arms shall promptly investigate the circumstances. Scullery men and the master-at-arms are instructed to refuse mess gear to unclean messmen. Messmen must comply with the following regulations:

"Messmen must keep their persons and clothing clean at all times. Scullery men and masters-at-arms are instructed to refuse mess gear to unclean messmen.

"Messmen turn in daily at 11 a. m. to the laundry representative (a messman) one suit of white undress and apron, all of which must be properly stenciled—uniform with the name, apron with the mess number. There shall be returned to them at the same time their clean uniforms and aprons.

"Messmen shall not destroy or in any way mutilate the mess identification tags attached to mess racks.

"Messmen shall not use any other than their own mess gear and racks.

"Messmen are required to be at the scullery 10 minutes before mess-gear call is sounded on the bugle, for cleanliness inspection by the master-at-arms, and for distribution of mess gear. They shall line up in single file at the starboard scullery counter and receive their marked racks of cups and racks of plates. After receiving these, each messman shall present himself at the port scullery counter for his marked rack of bowls, marked coffeepot, and water pitcher.

"Messmen are forbidden to accept mess racks which do not contain the allotted number of dishes. They shall notify the master-at-arms attached to the scullery, who shall make a replacement immediately, if possible.

"None other than a duly authorized messman will be permitted to draw or deliver mess gear to the scullery.

"Messmen are required to observe scullery blackboards for any new order or temporary changes affecting their daily routine.

"Messmen shall draw from the scullery hot soapy water, which he shall use for washing all mess gear except table and benches. Tables and benches will be scrubbed by hand brush ('ki yi') after each meal, using different water prepared at the scullery. This water does not contain soap, but contains 'Oakite,' a patent cleaning agent. All water drawn from the scullery must be drawn in pans bearing mess number of messman. The inside of the coffeepots shall be scoured by the scullery force.

"Messmen are issued one can of liquid bright-work polish on Monday of each week for the polishing of knives, forks, spoons, and coffeepots. These and other accessories must be kept in mess lockers, and must be ready for inspection by the master-at-arms at all times.

"Messmen shall form in two ranks abreast the galley. They shall group themselves in consecutive order; i. e., first-division messmen, second-division messmen, etc. The mess number shall be called out by the ship's cook in charge, and as each number is called the messman shall fall out of ranks and take his rack of containers, assuring himself that the containers belong to him. All racks of containers carry mess numbers and are marked with a stencil.

"Messmen are held accountable for all mess gear broken or lost by them. They shall purchase all missing articles from the canteen, securing a receipt for the same. This receipt shall be the only authority on which the master-at-arms shall replace mess gear lost or broken because of carelessness or irresponsibility of messmen."

VENTILATION.

In his survey of conditions of ventilation the medical officer will do well to limit his observations and requirements to questions concerning which simple but well-established practical principles apply, rather than to questions of theoretical merit only, all of which may be important in their proper fields of investigation. Common sense should rule, and if the medical officer will keep in mind that, aside from a few simple rules, his sense of smell and his sense of feeling are, after all, practical and fairly good indicators of the adequacy of any system of ventilation, he will have little difficulty in making

a practical survey of any ventilation system and will be able to reach sound conclusions as to the corrective measures that should be applied.

Since heating is so closely allied to all ventilation problems, it will be well for the medical officer to pay particular attention to the heating arrangements in his investigations of the ventilating systems.

WATER SUPPLY.

Since practically all the water used aboard ship for drinking, bathing, and culinary purposes is distilled, the water supply is not of such great import to the medical officer of a ship as it is to the health officer ashore. However, the stowage and distribution of water should receive the most careful attention of the medical officer. Stowage and gravity tanks should be inspected at frequent intervals and cleaned, whenever necessary, under proper supervision. Moreover, no water should be received on board for drinking, bathing, or culinary purposes which is not known to be pure and potable.

SEWAGE AND REFUSE DISPOSAL.

The sewage and refuse disposal systems aboard ship are, as a rule, complete to the finest detail and usually do not give the medical officer any great concern from the sanitary standpoint. However, nuisances may occur through negligence or improper operation of these devices. In such cases he should be on the alert to take steps to have such installations placed in a proper operating condition as soon as practicable.

HEALTH CONDITIONS IN THE NAVY.

The annual admission rate for all causes, entire Navy, for the week ending January 7, 1922, is better than it has been at this time of the year since weekly statistics have been kept in the Bureau of Medicine and Surgery, the rate being 459 per 1,000 per annum as compared with 760 per 1,000 in 1921, 600 per 1,000 in 1920, and 620 per 1,000 in 1919. The provisional rate for the entire year 1921 for all causes was 600.90 per 1,000 per annum.

The admission rate for diseases only for the week ending January 7, 1922, was 402.41 per 1,000 per annum, as compared with 550 per 1,000 per annum at a similar time last year.

There has been little change in the accident and injury rate during the past three years. The annual provisional admission rate for the year 1921 was 57.50 per 1,000, as compared with practically the same figures the previous year.

There have been comparatively few communicable diseases, with the exception of malaria and the venereal diseases, in the Navy during the past six months. The annual admission rate for the com-

municable diseases, exclusive of influenza and the venereal diseases, for the week ending January 7, 1922, was 25.61 per 1,000, as compared with 110 per 1,000 in 1921, 54 per 1,000 in 1920, and 58 per 1,000 in 1919. The annual admission rates per 1,000 for the individual communicable diseases reported for the weeks ending January 3, 1921, and January 7, 1922, were as follows:

Disease.	1921	1922
Smallpox	0.1	0
Cerebrospinal fever	.3	0
Diphtheria	2.5	0
Scarlet fever	3.0	0.4
Pneumonia	7.3	1.9
Malaria	9.0	12.03
Measles	25.0	.4
Mumps	52.0	.8

It will be seen from the above that malaria caused the largest proportion of admissions in 1922, the vast majority of the cases having been reported from Haiti and San Domingo.

Health conditions at training stations for the past month have been excellent, only an occasional case of communicable diseases having been reported.

The favorable conditions reported for communicable diseases, in general, do not apply to the venereal diseases, inasmuch as there has been no lowering in the rates of the venereal diseases during the past year. The provisional morbidity rate for all the venereal diseases was 124 per 1,000 per annum for 1921, as compared with 126 per 1,000 per annum in 1920.

The provisional mortality rate for the year 1921 was 2.4 per 1,000 per annum, as compared with 7.1 in 1920, 5.9 in 1919, and a mean death rate of 4.29 for the five-year period immediately preceding the war.

By reference to Table No. 1 in the vital statistics section of this issue it will be seen that there have been few admissions during the past month for communicable diseases in either the Atlantic or Pacific Fleets.

By reference to Table No. 6 it will be noted that for the four-week period ending December 31, 1921, venereal disease caused the greatest number of admissions to the sick list, with a rate of 125 per 1,000 per annum; the common diseases of the respiratory system stood next, with 90.37 per 1,000; injuries third, with 50.40 per 1,000; diseases of the digestive system fourth, with 51.08 per 1,000; and communicable diseases transmissible by insects and other arthopods fifth, with 42.70.

The following table shows graphically the admission rates per 1,000 for certain communicable diseases which occurred during the current month of December, 1921, as compared with the mean annual admission rate for December for the previous four-year period.

It will be noted that there was more than twice the amount of malaria in the Navy for the month than is normally expected. As stated previously, this is largely due to conditions in Haiti and San Domingo, which in both places are beyond the control of the marine forces operating there.

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Annual admission rates per 1,000 for certain communicable diseases, current month of December, 1921, in comparison with the mean annual admission rates, month of December, for the four-year period 1917–1921, inclusive.

Diseases.	Dec.,1917–20.	Dec., 1921.
Cerebrospinal fever	0.0	0.0
Diphtheria	1.8	3.9
German measles	4.2	.2
Influenza	54.9	7.6
Measles	13.3	.5
Mumps	45.9	.4
Pneumonia, broncho	6.7	.7
Pneumonia, lobar	4.7	1.3
Poliomyelitis	.08	.0
Scarlet fever	3.8	.5
Smallpox	.1	.0
Tuberculosis	3.8	2.9
Malaria	13.8	29.3
Typhoid fever	.2	.0

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "TENNESSEE," FOR THE YEAR, 1921.

No epidemics occurred in the ship during the year, although an occasional case of mumps and measles developed. Each case was isolated as it occurred, and consequently there was no spread of infection. Outbreaks of tonsillitis occurred from time to time and were traced, without fail, to neglect in the sterilization of mess gear. When this was corrected no more cases developed.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "SOUTH CAROLINA," FOR THE YEAR 1921.

It is the opinion of the medical officer that too many midshipmen were assigned to this ship during the "Midshipmen's practice cruise," resulting in overcrowding and unnecessary discomfort. Fortunately, the weather was good so that it was possible to make use of the exposed decks much of the time. If,

on the other hand, cold inclement weather had been encountered, it is believed that there would have been much sickness from tonsillitis and the various respiratory infections.

The health of the midshipmen was extremely good. There was far less sickness than on last year's cruise. One of the factors in causing this was the mild and sunny weather encountered with the consequent long hours spent in the fresh air, and another was the fact that no infection was introduced from without. There was no trouble from heat prostration in the fireroom this year compared with many cases last year, which is directly due to the constant use of forced draft while in the Tropics. The blowers drove out the heated air as it accumulated and replaced it with a constant supply of moving and comparatively cool air.

The employment of a vessel better suited to carrying large numbers of men would be more desirable for use in training midshipmen. This ship is not roomy at best, and the low quarter-deck being constantly awash, even in a moderate sea, renders unavailable a large part of the deck space; the forecastle is not much better. From the standpoint of health it is believed that an oil burning transport would be better suited for this duty, and would eliminate the rather gruelling duty of firing, which for some of the midshipmen of slight build is pretty trying. It would also do away with the dangers incident to coaling.

In the opinion of the medical officer too much time was spent in the Tropics. The climate met in Christiania was ideal and is such as should be sought in arranging for a cruise of this character. It is very similar to that of Seattle in summer. The runs at sea were rather long—jumps of 19 and 16 days, respectively, in two cases. The lack of exercise on board ship tends to constipation and it is thought that the runs between ports could be shortened with benefit. Ports notorious for venereal disease should be avoided as far as possible. The difference between certain cities in this respect is well illustrated by the fact that only 4 cases of venereal disease developed in the crew as the result of two weeks' stay at the clean and healthy port of Chrisitania while 36 cases resulted from a stay of the same duration at Lisbon.

The ration furnished at sea is much less in value than that allowed at the Naval Academy and the difference was felt. Perhaps what was most missed was the lack of an abundance of cereals, canned fruit, sugar, and preserves. The tropical weather encountered made the food problem especially difficult. The ice machines functioned badly and much food was spoiled by the heat and consequently had to be surveyed. Furthermore, the long runs between ports made it difficult to keep fresh vegetables on hand.

Sumarizing the above I should suggest for another cruise, a more suitable vessel, a more generous diet, especially in regard to cereals and sweets, an itinerary with less time spent in the Tropics and more in the temperate latitudes, at the same time avoiding raw, cold, or foggy areas, runs not quite so long, and the avoidance of notoriously infected ports.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "TACOMA," FOR THE YEAR 1921.

On January 28, 1921, F. L., sea–2c, U. S. N., a member of the crew of a motor sailer, while on an authorized recreation party, fell overboard into the Chepo River, Republic of Panama, a stream very heavily infested with alligators. He had the reputation of being an excellent swimmer, and was handling himself well when he suddenly disappeared from the surface of the water. The body was recovered two days later and found to be badly

mutilated in the region of the trunk and extremities, one leg having been severed above the knee, apparently the result of a bite.

A case of leprosy developed in a Filipino wardroom cook during the year. Owing to the fact that the writer was unsuccessful in his effort to demonstrate the specific organism from the ulcerative surface, gland juices, or nasal mucous membrane, the patient was transferred to the hospital with "Diagnosis undetermined."

During the latter days of June, while lying in the port of Balboa, Canal Zone, an epidemic of influenza occurred. The symptom complex was respiratory disorder, associated with a rather marked prostration. One case was complicated with pleurisy which progressed to an empyema. No pneumonias followed.

Conservation of fresh water is always a problem aboard ship. Every department requires its quota. It sometimes becomes the duty of the medical officer to see that every man and every department are supplied with the maximum amount of fresh water consistent with the vessel's resources. Officers and petty officers are prone to go to extremes at times in the conservation of fresh water. As an example, it may be mentioned that aboard this vessel there were many men reporting daily to the sick bay for treatment of infections of the hands and feet. An investigation, started by the Medical Department, revealed that the water, issued to the crew for bathing purposes, was deposited in a common reservoir after such use had been made of it. The water was then utilized again, from time to time, for scrubbing bags and hammocks. This polluted water was yielding a wide range of infections with consequent loss of time and limited usefulness on the part of the crew. The recommendation to abolish this practice was, of course, immediately adopted.

The high incidence of venereal disease continues in spite of all educational propaganda launched to curtail it. Venereal disease is very prevalent in all tropical ports. The lapse of time between exposure and prophylaxis is usually long. This coupled with the fact that this vessel is almost continually in the Tropics, explains the high venereal rates.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "MAYFLOWER," FOR THE YEAR, 1921.

From January 1 to July 31, 1921, there were only two admissions for venereal diseases, whereas from August 1 to December 1 there were 18. This increase is believed to be due, in a large measure, to the fact that during the latter months quite a large number of the experienced men among the crew received their discharges and were replaced by new men. The great percentage of such venereal infections occurred among the newly acquired personnel. This means, of course, that the men who contracted disease had not been fully impressed with the importance of venereal prophylaxis, in spite of the fact that each individual had been given careful instructions both in regard to the dangers of venereal disease and how to avoid infection.

From February 28 to March 12, a slight epidemic of acute follicular tonsillitis occurred among the engineer force. This was traced to a drinking cup at the ice machine. The cup was destroyed and the engineer force instructed in the dangers of the common drinking cup.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "SATURN," FOR THE YEAR 1921.

The U. S. S. *Saturn* during the past year has visited many ports in Alaska, and the medical officer has found marked improvements in epidemic diseases over conditions of last year.

Smallpox, measles, and influenza, which were so common last year, have disappeared from the western islands; and, in general, throughout Alaska, there have been only mild attacks of coryza and acute bronchitis; which is usual for such a climate.

The homes of the natives still remain in a poor sanitary condition, but most of the white people have homes comparing favorably with those in the United States.

The water supplies at various ports along the Alaskan coast are satisfactory and are usually drawn from mountain streams and lakes.

Attention is invited to the fact that the water supply at Unalaska, Alaska, is unsatisfactory for ships to take aboard for drinking purposes. This water is full of algæ, which, when inclosed in water-tight tanks, soon decompose and render the water useless for drinking because of the putrid taste resulting from such decomposition. Men will not drink enough of such water to keep their bodies in proper physical condition and to carry on the proper healthful physiological functions.

The U. S. S. *Saturn* has overcome this difficulty by avoiding the use of such water, by the frequent cleaning of water tanks, and by using the evaporator when necessary.

The disappearance of epidemic diseases in Alaska has allowed the crew all the liberty that is consistent with the work on this type of vessel.

The statistical data for 1921 show improvements over 1920 in all cases, with the exception of venereal disease and injuries.

The increase in admissions for injuries for 1921 over those for 1920, which nearly equaled the number for disease, is apparently due to the fact that the *Saturn* has been furnished a new crew this year. The new crew were unaccustomed to the type of stevedore work on this vessel and could not keep out of the way of loaded cargo, nets, and machinery about the ship.

The small amount of disease during 1921 shown in this report should be considered the result of preventive medicine.

There have been no cases of drowning and no deaths from any cause. The vessel has been free from cerebrospinal meningitis and chicken pox. Diphtheria has been prevalent along the coast of California, but no cases have occurred aboard this vessel. There were 18 cases of influenza, mild in character, about the average for any year.

There has been one case of chronic malaria. No cases of measles or pneumonia have appeared on the ship for the past three years. In 1920 two cases of scarlet fever occurred, while none appeared for 1921. Smallpox and tuberculosis show no admissions.

Venereal disease has been more prevalent this year than last year. There are a number of factors operating against proper preventive treatment. The lack of proper questioning of men reporting aboard from liberty parties as to whether they had had sexual intercourse and the failure of the men so instructed to report to the medical officer for prophylaxis have been, no doubt, responsible for a number of cases. During the past month strict orders have

been issued by the proper authority for deck officers to send men who have been exposed to the sick bay for prophylaxis. Since this order has been issued prophylaxis has been taken by all, with the result that no new cases have developed. Venereal inspection is held frequently so no one has an opportunity to conceal infection.

Another factor which increased the number of venereal infections is that prohibition, as carried out along the western coast, seems to offer places of enticement to men in the service. These "boot-legging" places of business are not only saloons, placing a man under the influence of alcohol, but they likewise place by his side the lowest type of prostitute. A man spending his time in such places frequently remains there for hours and is successfully infected before he returns to the ship in a sober state.

General Order No. 69 has been carefully carried out and will be in the future. There is no doubt that it will help greatly in combating venereal disease aboard this ship.

In general, the sanitary conditions about the ship are greatly improved over last year. Fresh and clean bedding is issued weekly. The crew is kept clean by being required to bathe frequently. Food is inspected daily by the medical officer, and he likewise makes a daily sanitary inspection of living quarters in addition to the usual Saturday morning inspection.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "FISH HAWK," FOR THE YEAR 1921.

On February 11 a patient was transferred to the U. S. Naval Hospital, Norfolk, Va., with "Diagnosis undetermined." A few days later a diagnosis of smallpox was established. The ship was immediately placed under quarantine restrictions and a close watch was kept on the crew, the temperature of every man on board being recorded twice daily. Three more suspects were transferred to the hospital a few weeks later, and it is understood a diagnosis of smallpox was established in all three cases. However, the records on board this ship show that only one more case developed, making two in all.

Immediately after the diagnosis was established in the first case, the entire crew was vaccinated; some of them two and three times.

Before the quarantine restrictions were lifted the ship was sent to the quarantine station, Baltimore, Md., and thoroughly fumigated under the supervision of the Public Health officials.

The general health of the crew during the year has been excellent.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "NOKOMIS," FOR THE YEAR 1921.

The statistical data for the year 1921 show that there were 13 admissions for venereal disease as against 11 admissions from all other causes. Of the 9 gonorrheal cases, 5 were recurrent infections; the other 4 failed to take early prophylaxis after exposure. Early prophylaxis is invaluable, and, undoubtedly, its value decreases proportionately as the time after exposure increases.

NOTES FROM UNITED STATES NAVAL TRAINING STATION, GREAT LAKES, ILL.

The following table affords a correct and easy comparison of the number of cases admitted and the annual rate per 1,000 complement of the infectious diseases between December, 1921, and the corresponding month of 1920:

Disease.	December, 1920.		December, 1921.	
	Rate.	Cases.	Rate.	Cases.
Cerebrospinal fever	0	0	0	0
Diphtheria	0	0	0.7	1
German measles	0	0	0	0
Influenza	4.3	4	0	0
Malaria	0	0	0	0
Measles	83.5	78	0	0
Mumps	81.3	76	0	0
Pneumonia	6.4	6	0	0
Scarlet fever	4.3	4	0	0
Smallpox	0	0	0	0
Chicken pox	0	0	0	0
Tuberculosis	0	0	0.7	1
Chancroidal infection	3.2	3	0	0
Gonococcus infection	61.0	57	7.2	10
Syphilis	3.2	3	3.6	5

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter. WSD/JBC 124942–0.
Serial No. 148—1921.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 16, 1921.

To: All naval hospitals (continental limits), naval hospital, Pearl Harbor, sick quarters, Marine Barracks, Quantico, Va.

Subject: Civilian employees; semimonthly pay periods; preparation of pay rolls; time and pay-roll record; service card.

Reference: M. and S. circular letter, serial No. 98—1921, No. 124942(22) May 24, 1921.

1. Beginning January 1, 1922, it is directed that all civilian employees at naval hospitals shall be paid twice each month only. The first pay period shall be from the 1st to the 15th day of the month, and the second pay period shall be from the 16th to the last day of the month.

2. If practicable, the names of the employees shall be arranged on the pay roll in the order in which the various ratings appear on the schedules of wages, as follows, which will bring together those exempt from retirement deductions:

Schedule J.—Hospital service.
Schedule K.—Laborer, helper, and mechanical service.
Group I.
Group II.
Group III.
Group IVa.

Schedule A.—Clerical service.

Group IVc (other than clerical force).

Group IVc (clerical force). Clerical employees paid from funds allotted by the Veterans' Bureau shall be shown separated from clerical employees of the hospital proper, under the heading "Veterans' Bureau Allotment."

TEMPORARY EMPLOYEES.

Employees authorized for limited periods shall be carried on the pay roll after all other employees, under the heading "Temporary employees."

3. This arrangement can most readily be put in effect by assigning a block of pay-roll numbers to each group, to cover changes in the numbers incident to the "turnover" in personnel. Thus, the hospital service may be assigned pay numbers 1 to 99; Group I, 100 to 149; Group II, 150 to 199; Group III, 200 to 299; and so on, the size of the block assigned depending on the number of employees in the group.

4. A carbon or other copy of the pay roll for each period shall be transmitted to the bureau promptly.

5. A supply of the new form (N. M. S. Hospital Form No. 62) for time, pay roll, and service record will be forwarded under separate cover, and will be placed in use beginning January 1, 1922. Additional copies may be obtained from the Navy Medical Supply Depot, Brooklyn, N. Y., as required. This form was devised after securing suggestions from all naval hospitals, has been approved by practically all of the hospitals as now prepared, and should be used in connection with S. and A. Form 206–C, Leave card. Suggestions for changes in the hospital form may be submitted after it has been in use for a period of six months.

E. R. STITT.

Circular letter.
Serial No. 149–1921.

SDS.
WHM/m 124842 (123).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 16 December, 1921.

To: All medical officers.

Subject: Review and initialing of all Form F cards by senior medical officers before same are forwarded to the Bureau of Medicine and Surgery.

Reference: (*a*) Bulletin No. 110 "Notes on Preventive Medicine for Medical Officers, U. S. Navy," pages 17 and 19, under instructions for the preparation of Form F card.

1. In view of the large number of incorrect Form F cards received in the bureau, it is evident that medical officers are not giving the necessary attention to the preparation of these cards.

2. As a result of frequent errors on Form F cards the preparation of morbidity statistics is delayed in the bureau. In order to reduce this to a minimum it is directed that before such cards are forwarded to the bureau that they be initialed in the lower right-hand corner by the senior medical officer of the ship or station. All Form F cards should be compared with the admission covered by the report in the health record to make certain that they are correct in every detail.

3. At large hospitals and training stations this duty may be delegated to a responsible officer.

E. R. STITT.

Circular letter.
Serial No. 150–1921.

WSG/T 128586 (123).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 19, 1921.

To: All naval hospitals.
Subject: Retention of certain officers and enlisted men for treatment.
References: (*a*) Section 2 of naval act approved June 4, 1920. (*b*) Article 1203 (7), Navy Regulations.

1. As the service connection of certain officers holding temporary appointments automatically expires (ref. *a*) on December 31, 1921, it is authorized where they are in need of further hospitalization, in the opinion of the commanding officer, they may be retained in hospital under treatment as supernumeraries.

2. This retention shall be only for those who voluntarily request further treatment; and shall be compulsory only for those who are mentally incapacitated and who would be a menace to the community if discharged.

3. The officers affected by this authorization will be informed by the commanding officer.

4. Special attention is also invited to reference (*b*) as follows:

Enlisted men held for treatment at a hospital after expiration of enlistment are held for the convenience of the Government, and are entitled to pay and allowances until date of actual discharge from the service.

E. R. STITT.

WSD/SAB 124942–O.

Circular letter.
Serial No. 151–1921.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 20, 1921.

To: All naval hospitals (continental limits), naval hospital, Pearl Harbor, Hawaii, sick quarters, Marine Barracks, Quantico, Va.
Subject: Civilian employees; computation of monthly pay.

1. It has been brought to the attention of the bureau that at some of the hospitals the monthly pay of civilian employees is not being computed correctly.

2. By the Secretary's letter of September 9, 1920, it was directed that the rates of pay of all civilian employees at naval hospitals be fixed on a per monthly basis, computed as 26 times the per diem rate of pay for the corresponding rating on the current schedule of wages. The method of computing the monthly pay is somewhat modified in paragraph 17 of the General Instructions supplementing inclosure K (Schedule of wages for employees under the Naval Establishment—Laborer, helper and mechanical service), accompanying the Secretary's letter of September 6, 1921, but the basis remains the same.

3. After the monthly pay has been correctly computed by multiplying the per diem or per hourly rate by 26 or 208 respectively, the resulting figure is the per monthly pay of the employee, and the per diem or hourly rate used in the computation is no longer a factor in his pay, which is thereafter handled in multiples of 30.

4. For example, the scheduled rate of pay for a chauffeur is 49 cents per hour. The monthly pay of a hospital chauffeur, therefore, would be 208 times 49 cents or $101.92. His daily pay would not be 8 times 49 cents or $3.92, but

one-thirtieth of $101.92 or $3.39 plus. This fractional difference is arbitrarily adjusted by making the pay for 22 days $3.40 per diem and for 8 days $3.39 per diem, the odd pay being evenly distributed throughout the 30 day period, on the 1st, 5th, 9th, 13th, 17th, 21st, 25th, and 29th. The deduction for each day of leave without pay (or other nonpay status) in this case would be $3.39 or $3.40, whichever might be required to bring the total monthly pay to the correct figure, $101.92.

5. Likewise, for employees placed on a part time basis under the provisions of ALNAVSTA 3, the daily pay is 1/30th of the monthly pay, which is the sum obtained by multiplying the amount given in the schedule of wages by 22 or 176, as the case may be. Employees who are placed on the 22 day or 176 hour basis will not be required to work Saturdays.

6. The following instructions quoted from the circular of the Office of the Comptroller of the Treasury, Treasury Department, Washington, March 24, 1917, explain in detail the method which should be followed in computing the monthly compensation for services rendered the United States:

SEC. 6. Hereafter, where the compensation of any person in the service of the United States is annual or monthly the following rules for division of time and computation of pay for services rendered are hereby established:

Annual compensation shall be divided into twelve equal installments, one of which shall be the pay for each calendar month; and in making payments for a fractional part of a month one-thirtieth of one of such installments, or of a monthly compensation, shall be the daily rate of pay. For the purpose of computing such compensation and for computing time for services rendered during a fractional part of a month in connection with annual or monthly compensation, each and every month shall be held to consist of thirty days, without regard to the actual number of days in any calendar month, thus excluding the thirty-first of any calendar month from the computation and treating February as if it actually had thirty days. Any persons entering the service of the United States during a thirty-one day month and serving until the end thereof shall be entitled to pay for that month from the date of entry to the thirtieth day of said month, both days inclusive; and any person entering said service during the month of February and serving until the end thereof shall be entitled to one month's pay, less as many thirtieths thereof as there were days elapsed prior to date of entry. *Provided*, That for one day's unauthorized absence on the thirty-first day of any calendar month one day's pay shall be forfeited.

This act is construed as requiring that—

1. Each calendar month shall consist of thirty days, and the computation of salary shall be by each month separately, one-twelfth of an annual salary constituting the compensation for each month.

2. One-thirtieth of a monthly installment of salary is to be allowed for each day of service from the first to the thirtieth, inclusive. The last day of February counts as three days of service for pay purposes (two days in leap year).

3. The thirty-first day of a month enters into the computation of salary only where there is one day's absence in a nonpay status on that day—that is, absence in a nonpay status did not occur also on the thirtieth. For such absence on the thirty-first one day's pay is forfeited.

E. R. STITT.

WSD/JBC 124677-O (123).

Circular letter.
Serial No. 152–1921.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 22, 1921.

To: All naval hospitals.
Subject: Disposal of remains of supernumerary patients who die in naval hospitals.
Reference: (a) Naval act of July 12, 1921.
(b) Decision of Comptroller General, November 25, 1921, in the case of Maj. Paul Chamberlain, U. S. Marine Corps, retired.

1. The current naval appropriation act, under the appropriation "Contingent, Bureau of Medicine and Surgery," contains the following language:

"For * * * care, transportation, and burial of the dead, including officers who die within the United States, and *supernumerary patients who die in naval hospitals;* * * *."

This language with regard to supernumerary patients first appeared in the naval act of July 11, 1919, having been recommended by this bureau specifically to provide authority of law which would enable the Navy to make proper disposal, in event of death, of the remains of patients who, although not on the active lists of the Navy or Marine Corps, are entitled by law or Navy Regulations to hospitalization, i. e., retired officers and enlisted men, pensioners, officers and men transferred to the Fleet Naval Reserve after 16 or more years' service, and men retained in naval hospitals for treatment after expiration of enlistment or discharge.

2. By his above-mentioned decision the Comptroller General has construed the word "supernumerary," as it appears in the appropriation "Contingent, Bureau of Medicine and Surgery," to mean only men whose terms of enlistment have expired while sick in hospitals. As it is well understood that funeral expenses are payable by the Government only when specific provision is made therefor by law, and as the appropriations contained in the naval act are available only for expenses incurred on behalf of persons who have died while in active service, the result of this decision is to prohibit the Navy from incurring expenses for the "care, transportation, and burial" of any class of supernumerary patients except men whose terms of enlistment have expired while sick in hospitals.

3. Veterans' Bureau patients are not affected by this decision.

4. Until this situation can be remedied by a rewording of the appropriation, it will be necessary for the hospitals to inform the next of kin of deceased supernumerary patients (with the one exception noted) that there is no authority of law by which the Navy can defray expenses for the care of the body, either in connection with transportation or burial. Their naval service, of course, entitles them to burial in a national or naval cemetery, but the expenses incident to preparation for such burial or of transportation to such cemetery can not be borne by the Navy.

5. However, should such supernumerary patient die in destitute circumstances, or should not the next of kin claim the body, it then devolves upon the hospital to make local burial, authority for defraying burial expenses under these conditions, as a charge against the appropriation, "Contingent, Medicine and Surgery," having been given in the decision of the Comptroller of the Treasury, dated July 24, 1914. (S. and A. Memoranda, vol. 6, p. 3322.)

6. The remains of men who die while being retained in hospital for treatment after discharge will be handled in the same manner as if death had occurred

while in the service, except that expenses for transportation will be a charge against "Contingent, Medicine and Surgery," instead of "Bringing home remains of officers, etc., Navy Department."

7. In this connection attention is invited to article 1203(7), Navy Regulations, and this bureau's circular letter, serial No. 150–1921, No. 128586, December 19, 1921.

E. R. STITT.

Circular letter.
Serial No. 153–1921.

WRJ/T 125884 (124).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., December 29, 1921.

To: All naval hospitals.
Subject: Summary of maintenance expenditure report—Hospital Form 34 A.
Reference: Bureau's circular letter No. 132683(62) of June 16, 1921.

1. Beginning with the first quarter of the present fiscal year the "Summary of maintenance expenditure report," Hospital Form No. 34 A, will be submitted quarterly.

2. Reports from hospitals within the continental limits of the United States will be mailed so as to reach the bureau not later than the last day of the month following the quarter for which the report is submitted.

3. Reports from hospitals without the continental limits of the United States will be mailed not later than the 15th of the month following the quarter for which the report is submitted.

4. In addition to the statement required on face of summary (inclosure with ref. a), the total number of sick days for (a) naval patients, (b) Veterans' Bureau patients, and (c) supernumerary patients will be give separately.

5. The above report is required to enable the bureau to prepare periodical reports required by the Bureau of the Budget and the Veterans' Bureau.

6. Hospitals which, in compliance with a recent request (dated Dec. 1, 1921), submitted reports for the quarter ended September 30, 1921, will not be required to duplicate such reports for that quarter.

E. R. STITT.

Circular Letter.
Serial No. 154–1922.

WSD/JBC 129733.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., January 6, 1922.

To: All naval hospitals.
Subject: Transportation of remains of Veterans' Bureau patients.
Reference: (a) M. & S. circular letter, serial No. 63–1920, No. 129733(54), October 22, 1920.
(b) M. & S. circular letter, serial No. 115–1921, No. 124677–0, August 2, 1921.

1. In order that charges for transportation of the remains of Veterans' Bureau patients who die in naval hospitals and are sent to their homes for burial may be paid by the Veterans' Bureau, it is directed that hereafter the

following entry be typewritten across the face of all copies of the bill of lading by which such dead are transported. This entry may be placed directly below the red lettering on the bill:

"TRANSPORTATION CHARGES UNDER THIS BILL OF LADING ARE PAYABLE BY THE U. S. VETERANS' BUREAU, WASHINGTON, D. C., IN ACCORDANCE WITH THE BUREAU OF WAR RISK INSURANCE LETTER DATED OCTOBER 16, 1920."

E. R. STITT.

Circular letter.
Serial No. 155–1922.

WSD/JBC 124942–O.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., January 6, 1922.

To: All Naval Hospitals (continental limits); naval hospital, Pearl Harbor, Hawaii; sick quarters, Marine Barracks, Quantico, Va.; naval dispensary, Washington, D. C.; Naval Medical School.

Subject: Civilian employees; computation of monthly pay.

Reference: Bureau's circular letter, serial No. 151–1921, No. 124942–O, December 20, 1921.

Inclosure: Copy of letter No. 124942, January 5, 1921, to naval hospital, Mare Island, Calif.

1. As there appears still to be some uncertainty with regard to the method of computing the monthly pay of civilian employees, the inclosed letter is hereby made applicable to all organizations above addressed.

2. Under separate cover, the bureau is inclosing a copy of the "Government Salary Tables," 1920 edition, which may be of assistance in indicating the standard method of computing monthly pay. An endeavor is being made to obtain copies of an earlier edition, giving the basic monthly and daily rates of pay without deductions for retirement fund, which would be of greater value, as the rates correspond more nearly to those of the hospitals.

E. R. STITT.

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WSD/JBC 124942.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., January 5, 1922.

To: Naval hospital, Mare Island, Calif.

Subject: Civilian pay roll for November, 1921.

Reference: M. & S. circular letter, serial No. 151–1921, No. 124942–O, December, 9, 1921.

1. In examining your pay roll for the period of November 1–15, 1921, the following discrepancies are noted.

(*a*) Pay number 104, Grayson, A. W., fireman; pay per month $108.16; number of days 12; regular compensation $49.92. A deduction of $4.16 is made, although there is no explanation. If this man was absent in a non-pay status for one day the deduction should have been either $3.60 or $3.61. His monthly pay being $108.16, his daily pay is for 16 days of the monthly period, $3.61 and fourteen days $3.60, the odd and even days being arbitrarily distributed as equally as possible throughout the 30-day period.

(*b*) Pay number 39, Fritsche, Frank E., machinist; pay per month, $151.84; number of days, 7; regular compensation, $40.88; amount paid, less 2½ per

cent retirement reduction, $39.86; remarks, L. W. O. P., 11–1 to 11–6–21. The monthly pay in this case is correct, but in calculating the pay for the period November 1 to 15 as $40.88 an error has been made. His daily pay is $5.84 (8×73 cents, the hourly rate given in the schedule of wages.) The pay of this employee for one day is one-thirtieth of $151.84 or $5.06 2/15; the fraction being arbitrarily absorbed by making the pay for 26 days of the monthly period $5.06, and for 4 days (7th, 14th, 21st, and 29th) $5.07. Hospital employees are not on an hourly or daily pay basis but are on a monthly or 30-day basis, being paid for Sundays. This employee is stated to have been absent in a nonpay status for six days, November 1 to 6, inclusive, the sixth day being Sunday. Article 404 (11) Naval Instructions, directs that—

> "Sundays or legal holidays occurring within a period of sick leave or leave without pay will be charged, but when occurring at the beginning or ending of such absence will not be charged."
>
> (NOTE.—For employees on a reduced time basis, Saturdays occurring within a period of leave without pay are construed the same as Sundays or legal holidays).

Accordingly in this case, the deduction for leave without pay should be for 5 days at $5.06 per day, or $25.30. His pay for the first half of November, therefore, should be $75.92 minus $25.30, or $50.62 instead of $40.88. He is paid for 10 days, 8 at the rate of $5.06, and 2 at $5.07.

2. For each day of absence in a nonpay status during a 30-day month, one-thirtieth of the monthly pay of the employee is deducted from his total monthly pay. The following decisions (13 Com. Dec., 205) have been rendered on this point with regard to the 28 and 31 day months:

(*a*) When an employee is absent without authority or in a nonpay status one day in a 31-day month, he is entitled to twenty-nine thirtieths of his monthly compensation, one-thirtieth of his monthly compensation being deducted for his absence.

(*b*) When an employee is absent without authority two days in February, he is entitled to twenty-eight thirtieths of his monthly compensation, two-thirtieths being deducted on account of his two-day absence in nonpay status.

(*c*) When an employee serves from the 1st to 15th, inclusive, of February and is granted leave without pay until the 28th of February, he is entitled to seventeen-thirtieths of his monthly compensation, thirteen-thirtieths being deducted on account of his 13-day absence without pay.

3. With regard to the comptroller's decision that—

> "The thirty-first day of a month enters into the computation of salary only where there is one day's absence in a nonpay status on that day—that is, absence in a nonpay status did not occur also on the thirtieth. For such absence on the thirty-first one day's pay is forfeited."

it should be clearly understood that for one day's absence in a nonpay status on the 31st alone, one day's pay is forfeited. But if absence in nonpay status also occurred on the 30th—that is, on both the 30th and 31st—the 31st does not enter into the computation, and the employee is charged only for the 30th. Thus, if present from the 1st, to and including the 29th, and absent in nonpay status on the 30th and 31st, he would be paid twenty-nine thirtieths of his monthly pay.

4. The question of absence without leave and leave without pay (leave in excess of the 30 days allowed by law) is an administrative one. An employee persistently absenting himself without permission is an undesirable factor and should be discharged (see department's circular letter No. Bg–Wo, Febru-

ary 21, 1921, regarding procedure in cases of employees absent for six successive musters); while the granting of leave without pay in addition to 30 days with pay is an indication of excess personnel. An organization operating with the minimum force required can not spare the services of an employee for more than the legal period of leave with pay. Leave without pay should not be granted until all annual leave has been exhausted, and then only in emergency.

5. It must be understood that for hospital employees the per diem or hourly rate given in the schedule of wages is used only as a basis for calculating monthly pay. It is the desire of the department that all employees under the Naval Establishment shall be paid at equal rates, but in recognition of the somewhat different conditions at naval hospitals, where emergencies in connection with care of the sick render the fixing of definite hours of labor impracticable, hospital employees are paid a monthly rate of 26 times the per diem of the corresponding yard rating, 26 being the average number of days in a month for which a yard employee is paid. Ordinarily the pay of the yard employee for 26 days and the hospital employee for one month will be the same, but in February and in any 30-day month in which five Sundays occur the hospital employee will receive more pay. On the other hand, he is subject to call, when necessary, for work in excess of eight hours or on Sunday without extra pay.

6. An employee who works each week day from the 1st to the 15th, or from the 16th to the end of the month, should be credited in the "number of days" column of the pay roll with 15 days, as he is paid for 30 days each month, including Sundays.

7. Likewise, an employee on a reduced-time basis, under Alnavsta 3, who works every week day except Sunday should be credited with 15 days at the reduced monthly rate, as he is constructively present both on Saturday and Sundays.

For example, a machinist on a full-time basis who works all week days from the 1st to the 15th should be paid 15×$5.06, two-fifteenths, or $75.92; and one on a reduced-time basis who works all week days except Saturdays should be paid 15×$4.28, four-fifteenths, or $64.44. The "pay per month" column will indicate whether the employee is on a full or reduced time basis.

8. An employee laid off on each Saturday, under Alnavsta 3, is on a monthly-pay basis of 22 times the yard rate, or the average number of days for which a yard employee is paid. Hospital employees on this reduced monthly basis, while subject to overtime and Sunday work without additional compensation, can not be required to work on Saturday at the reduced monthly pay, as the pay for Saturday has been specifically eliminated. If, due to some emergency, such an employee should be called to duty on Saturday, he will be paid for that day one-thirtieth of the full-time pay of his rating.

E. R. Stitt.

N–5/F/McL 5511–379.

Navy Department,
Bureau of Navigation,
Washington, D. C., 27 December, 1921.

Bureau of Navigation Circular Letter No. 43–21.

To: All ships and stations.

1. In reviewing the proceedings of the courts of inquiry and boards of investigation convened to inquire into the circumstances attending the deaths of Anton

Hubn, late seaman second class, United States Navy, and John J. Morrill, late seaman second class, United States Navy, on the U. S. S. *Huron*, and of William Sabon, late seaman first class, United States Navy, on board the U. S. S. *Hopkins*, the bureau notes that in each case death was the result of asphyxiation while working in an insufficiently ventilated compartment.

2. The accident on the *Huron*, which occurred in a hold of that vessel in which flour was stored, discloses the fact that carbon dioxide is generated from stored wheat and its products. While figures showing the exact amount of carbon dioxide generated are not available, the quantity is generally considered small and negligible where the flour is stored in a manner permitting free ventilation; in the absence of ventilation, however, carbon dioxide will accumulate and vitiate the air of a storeroom to a considerable extent, particularly in cases where the amount of unoccupied space in the room is small. The quantity of carbon dioxide thus developed is usually greatly increased if the flour contains a relatively large amount of moisture or if infested with insects, but it may appear in the presence of apparently good flour.

3. The death on board the U. S. S. *Hopkins* occurred in the chain locker of that vessel during the process of tiering the anchor chain. A coat of black boot topping was being applied to the chain on deck, and the men were working in shifts tiering it as it came below. Since the testimony indicates that all usual precautions had been taken to assure the proper ventilation of this compartment, and an accident nevertheless occurred, it seems quite apparent that ordinary precautions are not always adequate to insure safety.

4. The above information is promulgated to the service in order to emphasize the necessity of utilizing every available means properly to ventilate below-deck compartments prior to the entry of personnel, and all commanding officers are therefore directed to take appropriate steps on board the vessels under their command to prevent future accidents of this nature.

PHILIP WILLIAMS, *Acting.*

VITAL STATISTICS.

Annual rates, shown in the succeeding statistical tables, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{365}{28}$ or $\frac{365}{35}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

Where no figures appear in a given column, it may be taken for granted that the disease did not occur or, if in reference to hospitals, that no case was admitted.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service.*

ATLANTIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
1921.										
Month ended Oct. 31	16	2,972	214	864.06	153	617.76	61	246.29	58	234.18
Month ended Nov. 30	18	4,035	173	514.50	144	428.25	29	86.24	76	226.02
Month ended Dec. 31	62	10,313	393	457.29	351	408.42	42	48.87	111	129.18
Average of the rates				611.95		484.81		133.13		196.46

Communicable diseases were reported as follows:

	Chicken pox.	Malaria.	Pneumonia.	Influenza.
Month ended Oct. 31:				
U. S. S. St. Louis		1		1
Month ended Nov. 30:				
U. S. S. McFarland				1
U. S. S. Utah			1	
Month ended Dec. 31:				
U. S. S. Columbia				8
U. S. S. St. Louis				4
U. S. S. North Dakota	8			1

PACIFIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
1921.										
Month ended Oct. 31	35	8,597	359	501.10	320	446.66	39	54.40	73	101.89
Month ended Nov. 30	38	7,510	291	464.98	249	397.86	42	67.11	68	108.65
Month ended Dec. 31	52	11,643	538	554.50	424	437.00	114	117.50	146	150.48
Average of the rates				506.86		427.17		79.67		120.34

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

PACIFIC FLEET—Continued.

Communicable diseases were reported as follows:

	Diphtheria.	Malaria.	Mumps.	Pneumonia.	Influenza.	Tuberculosis.
Month ended Oct. 31:						
U. S. S. New Mexico	1					1
U. S. S. Mississippi					3	
U. S. S. Melville		1				
U. S. S. Charleston		1			1	
U. S. S. Tennessee					1	
U. S. S. New York	1	1	14		1	
Month ended Nov. 30:						
U. S. S. Charleston					2	
U. S. S. New York			1		3	
U. S. S. Mississippi					1	1
U. S. S. New Mexico			1			
Month ended Dec. 31:						
U. S. S. Wyoming					1	
U. S. S. Vestral				1		
U. S. S. California					1	
U. S. S. Texas		1	1		1	
U. S. S. Cardinal						1

MARNIES ON FOREIGN SHORE SERVICE.

	Number of reports received.	Complement.	Admissions, communicable disease, exclusive of venereal disease.	Annual rate per 1,000.
Month ended Nov. 30, 1921	14	3,074	128	499.67

Communicable diseases were reported as follows:

	Malaria.	Dengue.	Influenza.	Tuberculosis.
Field hospital, Fifteenth Regiment, Second Brigade, United States Marine Corps, San Pedro de Marcoris, Santo Domingo, Dominican Republic [1]				
All outposts, San Pedro de Marcoris, Santo Domingo, Dominican Republic [1]				
Field hospital, Second Brigade, Santo Domingo City, Dominican Republic	9	35		
Fourth Regiment, United States Marine Corps, Santo Domingo City, Dominican Republic	6	14		
United States marine barracks, Azua, Dominican Republic	1	1		
United States marine barracks, training center, Santo Domingo City, Dominican Republic	4	9		
United States Marine aviation force, Santo Domingo, Dominican Republic	6	1		
First Brigade, Eighth Regiment, Port au Prince, Haiti				
Haitian gendarmerie, United States Marine Corps, Port au Prince, Haiti	2	1		
Marine barracks, St. Thomas, Virgin Islands		7		
Marine barracks, Barahona, Dominican Republic	6	3		
Marine barracks, St. Croix, Virgin Islands		12		
Marine detachment, Camaguey, Cuba	6		1	
Marine detachment, Managua, Nicaragua	1			
Marine detachment, Peking, China				1
Naval and Marine Corps graves registration service, Paris, France				

[1] Report not received for November.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and U. S. Marines on foreign shore service, November, 1921.*

ATLANTIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. North Dakota	1,100	3	32.72	36.35
U. S. S. Delaware	1,155	1	10.38	43.87
U. S. S. Arkansas	1,219	2	19.68	77.33
U. S. S. Wyoming	1,404	6	51.28	111.26
U. S. S. Texas	1,189	10	100.92	124.44
U. S. S. Kansas	360	2	66.66	135.00
U. S. S. Florida	1,100	4	43.63	137.69
U. S. S. Galveston	346	5	173.41	141.28
U. S. S. New York	1,187	10	101.09	158.04
U. S. S. Michigan	314	0	0	161.93
U. S. S. South Carolina	391	3	92.07	163.59
U. S. S. Sacramento	193	2	124.35	170.06
U. S. S. Minnesota	416	3	86.53	170.29
U. S. S. Utah	1,067	37	416.11	190.81
U. S. S. Cleveland	317	3	113.56	208.32
U. S. S. Denver	(1)	.....	.....	229.37
U. S. S. Dolphin	140	2	171.42	257.60
U. S. S. Tacoma	300	9	360.00	317.52
U. S. S. Niagara	198	6	363.63	337.50
U. S. S. Asheville	176	9	613.63	352.73
U. S. S. St. Louis	521	12	276.39	507.90
Destroyer force.				
U. S. S. McKean	52	0	0	0
U. S. S. Stevens	55	0	0	0
U. S. S. Truxton	98	0	0	0
U. S. S. Denebola	280	0	0	(2)
U. S. S. Bancroft	58	0	0	19.80
U. S. S. Toucey	81	0	0	19.93
U. S. S. Ellis	57	0	0	22.51
U. S. S. W. C. Wood	52	0	0	23.90
U. S. S. Davis	51	0	0	24.84
U. S. S. Paul Jones	56	0	0	25.47
U. S. S. Worden	85	0	0	26.66
U. S. S. Hale	81	0	0	32.60
U. S. S. McDougal	88	0	0	34.43
U. S. S. Colhoun	56	0	0	35.60
U. S. S. Case	76	1	157.89	36.36
U. S. S. Graham	99	0	0	36.50
U. S. S. Belknap	64	0	0	37.55
U. S. S. Sharkey	80	2	300.00	40.26
U. S. S. Putnam	76	1	157.89	41.09
U. S. S. Osborne	74	0	0	41.23
U. S. S. Nicholson	51	0	0	42.62
U. S. S. Herbert	91	1	131.86	44.11
U. S. S. Manley	57	0	0	44.28
U. S. S. Sigourney	60	1	200.00	47.61
U. S. S. Mason	90	0	0	50.68
U. S. S. Osmond Ingram	(1)	.....	.....	51.06
U. S. S. Bell	52	0	0	51.28
U. S. S. O'Brien	57	0	0	52.74
U. S. S. Taylor	53	2	452.83	53.57
U. S. S. Blakely	92	2	260.86	53.95
U. S. S. Hopewell	59	2	406.77	53.97
U. S. S. Downes	50	0	0	57.00
U. S. S. Ringgold	60	1	200.00	59.21
U. S. S. Schenck	83	2	289.15	59.40
U. S. S. Semmes	96	0	0	60.30
U. S. S. Dyer	54	0	0	61.22
U. S. S. McCalla	56	0	0	61.22
U. S. S. Connor	54	1	222.22	61.53
U. S. S. Rodgers	56	0	0	61.85
U. S. S. Branch	60	0	0	62.50
U. S. S. Meredith	(1)	.....	.....	63.32
U. S. S. Pope	65	0	0	63.60
U. S. S. Barney	98	4	489.79	67.20
U. S. S. Winslow	55	1	218.18	68.18
U. S. S. J. K. Paulding	54	0	0	69.09
U. S. S. Stewart	100	1	120.00	70.07

[1] No report received for November.
[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

ATLANTIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
U. S. S. Dale	75	0	0	70.79
U. S. S. McKee	57	0	0	71.42
U. S. S. Shaw	48	0	0	72.43
U. S. S. Wadsworth	58	0	0	73.17
U. S. S. Rowan	49	2	489.79	74.84
U. S. S. Wainwright	54	0	0	77.92
U. S. S. Ericsson	59	0	0	81.63
U. S. S. Bernadou	105	2	228.57	81.94
U. S. S. Gridley	50	1	240.00	82.47
U. S. S. Allen	66	1	181.81	82.64
U. S. S. King	59	0	0	83.76
U. S. S. Lardner	64	0	0	83.91
U. S. S. Foote	54	1	222.22	84.50
U. S. S. Thomas	62	0	0	85.56
U. S. S. Cassin	55	2	436.36	86.02
U. S. S. Dickerson	65	1	184.61	86.95
U. S. S. Benham	66	0	0	89.88
U. S. S. Leary	86	0	0	90.00
U. S. S. Goldsborough	91	1	131.86	90.22
U. S. S. Ford	80	2	300.00	90.36
U. S. S. Bush	75	1	160.00	91.88
U. S. S. Little	59	1	203.38	92.13
U. S. S. Barry	61	0	0	92.30
U. S. S. Porter	60	0	0	93.50
U. S. S. Rochester	491	7	171.07	94.91
U. S. S. Dupont	60	0	0	96.15
U. S. S. Craven	57	0	0	98.19
U. S. S. Breckenridge	75	0	0	98.36
U. S. S. Hopkins	70	1	171.42	100.00
U. S. S. Bridgeport	656	6	109.75	101.14
U. S. S. Black Hawk	369	1	32.52	102.96
U. S. S. Kalk	55	0	0	105.96
U. S. S. Billingsley	66	3	545.45	106.76
U. S. S. Charles Ausburne	75	0	0	108.43
U. S. S. Preble	100	0	0	109.58
U. S. S. Dixie	617	7	136.14	110.80
U. S. S. G. E. Badger	72	2	333.33	111.36
U. S. S. Balch	49	0	0	112.41
U. S. S. Herndon	64	0	0	113.02
U. S. S. Tillman	121	1	99.17	113.02
U. S. S. Pruitt	80	1	150.00	113.97
U. S. S. Breck	66	2	363.63	116.15
U. S. S. Dahlgren	93	0	0	117.10
U. S. S. Gregory	56	0	0	119.80
U. S. S. W. B. Preston	96	1	125.00	120.63
U. S. S. J. F. Talbot	55	0	0	122.24
U. S. S. Maddox	57	1	210.52	122.44
U. S. S. Lawrence	65	3	553.84	124.13
U. S. S. Haraden	61	1	196.73	124.81
U. S. S. Cowell	52	0	0	125.00
U. S. S. Gwin	57	2	421.05	126.76
U. S. S. Leonidas	273	2	87.91	127.76
U. S. S. Sicard	90	5	666.66	127.88
U. S. S. Peary	73	2	328.76	130.96
U. S. S. Wilkes	54	0	0	131.80
U. S. S. Flusser	80	2	300.00	134.40
U. S. S. Parker	55	0	0	137.29
U. S. S. Crowninshield	100	3	360.00	145.51
U. S. S. Robinson	65	1	184.61	146.56
U. S. S. Hatfield	76	2	315.78	148.67
U. S. S. Stringham	58	0	0	151.51
U. S. S. Hunt	67	5	895.52	153.00
U. S. S. Abbott	65	0	0	153.11
U. S. S. Conyngham	60	1	200.00	153.33
U. S. S. Cummings	59	3	610.16	155.50
U. S. S. Reid	105	0	0	156.80
U. S. S. Cole	66	1	181.81	162.40
U. S. S. Noa	56	2	428.57	170.04
U. S. S. Converse	87	3	413.79	171.67
U. S. S. McCook	61	0	0	177.63
U. S. S. Bainbridge	65	2	369.23	179.10
U. S. S. Biddle	60	1	200.00	180.78
U. S. S. Stockton	54	2	444.44	182.43
U. S. S. Kimberley	57	0	0	182.92
U. S. S. Bagley	60	0	0	187.09
U. S. S. Goff	56	3	642.85	195.29
U. S. S. Pillsbury	75	0	0	205.83
U. S. S. Humphreys	63	0	0	215.87

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

ATLANTIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
U. S. S. Hulbert	(1)			218.18
U. S. S. Abel P. Upshur	130	1	92.30	230.40
U. S. S. Clemson	60	2	400.00	237.62
U. S. S. Dallas	73	2	328.76	238.69
U. S. S. Williamson	(1)			253.33
U. S. S. Isherwood	67	3	537.31	269.15
U. S. S. Fairfax	54	1	222.22	277.22
U. S. S. Caldwell	57	0	0	287.76
U. S. S. Brooks	86	0	0	311.43
U. S. S. Satterlee	94	0	0	331.07
U. S. S. Overton	121	2	198.34	346.41
U. S. S. Reuben James	134	1	89.55	455.37
U. S. S. Kane	68	2	352.94	491.22
U. S. S. Gilmer	70	1	171.42	545.88
U. S. S. Childs	124	7	677.41	638.56
U. S. S. McFarland	115	6	626.08	746.36
U. S. S. Sands	(1)			763.28
U. S. S. Sturtevant	(1)			1,023.36
U. S. S. Luce	97	0	0	0
U. S. S. Woodcock	(1)			0
U. S. S. Curlew	45	0	0	(2)
U. S. S. Eagle No. 31	1,104	3	32.60	(2)
U. S. S. Potomac	43	1	279.06	(2)
U. S. S. Swan	56	0	0	43.79
U. S. S. Contocook	48	1	250.00	45.11
U. S. S. Quail	50	0	0	57.41
U. S. S. Maumee	114	0	0	60.21
U. S. S. Sandpiper	63	0	0	65.12
U. S. S. Savannah	654	5	91.74	71.17
U. S. S. Relief	440	1	27.27	72.65
U. S. S. Culgoa	147	3	244.89	75.63
U. S. S. Mayflower	196	4	244.89	84.50
U. S. S. Murray	104	0	0	94.75
U. S. S. Owl	62	0	0	98.56
U. S. S. Bushnell	345	1	34.78	99.79
U. S. S. Mallard	54	1	222.22	100.84
U. S. S. Columbia	806	11	163.77	100.93
U. S. S. Proteus	173	0	0	101.57
U. S. S. Algorma	39	0	0	102.56
U. S. S. Chewink	44	0	0	107.71
U. S. S. San Francisco	318	2	75.47	108.20
U. S. S. Bridge	208	3	173.07	113.74
U. S. S. Harding	54	1	222.22	114.40
U. S. S. Shawmut	314	2	76.43	117.10
U. S. S. Lark	54	0	0	122.27
U. S. S. Lebanon	80	4	600.00	122.32
U. S. S. Hannibal	146	1	82.19	122.89
U. S. S. Red Wing	60	2	400.00	123.34
U. S. S. Brazos	125	2	192.00	125.90
U. S. S. Reina Mercedes	754	4	63.66	129.26
U. S. S. Mahan	100	1	120.00	133.63
U. S. S. Prometheus	389	1	30.84	133.86
U. S. S. Bobolink	50	0	0	144.82
U. S. S. Patapsco	34	1	352.94	146.04
U. S. S. Beaver	600	2	40.00	151.27
U. S. S. Sciota	26	0	0	162.60
U. S. S. Iuka	42	0	0	166.20
U. S. S. Lansdale	89	0	0	170.69
U. S. S. Robin	54	0	0	172.83
U. S. S. Teal	50	1	240.00	178.57
U. S. S. Eagle No. 17	340	6	211.76	182.42
U. S. S. Carrabassett	50	1	240.00	195.91
U. S. S. Vireo	56	0	0	210.11
U. S. S. Montcalm	42	1	285.71	222.22
U. S. S. Rail	55	2	436.36	231.88
U. S. S. Vixen	78	2	307.69	247.27
U. S. S. Nereus	149	2	161.07	257.05
U. S. S. Olympia	467	6	154.17	271.97
U. S. S. Pecos	116	9	931.03	326.53
U. S. S. Scorpion	137	3	262.77	330.35
U. S. S. Nokomis	84	3	428.57	332.01

[1] No report received for November.
[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

PACIFIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. Nevada	1,086	2	22.09	66.31
U. S. S. Oklahoma	1,060	7	79.24	67 79
U. S. S. Arizona	1,157	8	82.97	73.08
U. S. S. Tennessee	1,192	17	171.14	111.56
U. S. S. Pennsylvania	1,325	22	199.24	112.37
U. S. S. California	1,310	11	100.76	118.60
U. S. S. New Mexico	1,333	5	45.01	120.16
U. S. S. Mississippi	1,144	5	52.44	129.14
U. S. S. Maryland	1,415	10	84.80	134.36
U. S. S. Idaho	1,133	10	105.91	139.77
Destroyer force.				
U. S. S. Coghlan	49	0	0	0
U. S. S. Farenholt	103	0	0	0
U. S. S. Litchfield	55	0	0	0
U. S. S. Somers	63	0	0	0
U. S. S. Thatcher	65	0	0	0
U. S. S. Walker	43	0	0	0
U. S. S. Hamilton	62	0	0	16.19
U. S. S. Chew	61	0	0	16.66
U. S. S. Fuller	55	0	0	17.24
U. S. S. Claxton	64	0	0	19.49
U. S. S. Schubrick	39	0	0	21.27
U. S. S. Williams	33	0	0	22.68
U. S. S. Shirk	101	1	118.81	22.81
U. S. S. Percival	52	0	0	23.07
U. S. S. Marcus	104	0	0	24.64
U. S. S. Crane	270	0	0	24.84
U. S. S. MacDonough	106	1	113.20	25.31
U. S. S. Bruce	55	0	0	28.00
U. S. S. McLanahan	(1)			31.66
U. S. S. Charleston	414	4	115.94	32.53
U. S. S. Palmer	40	0	0	35.82
U. S. S. Sloat	105	0	0	36.80
U. S. S. Welles	57	0	0	36.92
U. S. S. Crosby	47	0	0	38.77
U. S. S. Ramsay	65	0	0	39.43
U. S. S. Schley	43	1	279.06	40.40
U. S. S. Kidder	103	0	0	40.67
U. S. S. Greene	42	1	285.71	42.17
U. S. S. Selfridge	110	1	109.09	42.47
U. S. S. Melvin	100	0	0	42.55
U. S. S. Laub	(1)			45.36
U. S. S. Young	54	0	0	46.06
U. S. S. Swasey	39	0	0	48.38
U. S. S. Hazlewood	31	2	774.19	48.53
U. S. S. Badger	64	1	187.50	48.64
U. S. S. Doyen	40	1	300.00	49.79
U. S. S. Sumner	107	0	0	50.42
U. S. S. MacLeish	33	0	0	50.73
U. S. S. J. F. Burns	50	1	240.00	52.74
U. S. S. Howard	86	1	139.53	53.75
U. S. S. Gamble	59	0	0	54.05
U. S. S. Radford	70	0	0	55.04
U. S. S. Sinclair	(1)			55.29
U. S. S. Kennison	65	0	0	56.33
U. S. S. Hull	109	1	110.09	58.82
U. S. S. Woodbury	62	2	387.09	59.33
U. S. S. Edsall	33	0	0	61.47
U. S. S. Lamberton	65	0	0	61.53
U. S. S. Prairie	465	0	0	61.73
U. S. S. Ballard	60	2	400.00	62.93
U. S. S. Thornton	37	0	0	63.49
U. S. S. Chauncey	61	1	196.72	63.82
U. S. S. Farragut	54	1	222.22	64.28
U. S. S. Stansbury	88	0	0	64.86
U. S. S. Meade	38	0	0	64.95
U. S. S. S. P. Lee	52	1	230.76	66.42
U. S. S. Hogan	98	0	0	67.34
U. S. S. Renshaw	99	0	0	67.49
U. S. S. Babbitt	59	1	203.38	67.79
U. S. S. Nicholas	52	0	0	67.92
U. S. S. Wood	106	1	113.20	68.47
U. S. S. O'Bannon	105	1	114.28	69.12

[1] No report received for November.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

PACIFIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
U. S. S. Edwards	79	0	0	70.90
U. S. S. Robert Smith	107	1	112.14	72.43
U. S. S. Champlin	32	0	0	72.72
U. S. S. Yarborough	93	2	258.06	73.50
U. S. S. Meyer	38	1	315.78	74.90
U. S. S. Turner	57	1	210.52	75.94
U. S. S. Parrott	45	0	0	78.06
U. S. S. Mullany	103	1	116.50	79.29
U. S. S. Aulick	56	0	0	81.21
U. S. S. Reno	62	0	0	83.69
U. S. S. Melville	408	0	0	83.87
U. S. S. Boggs	68	0	0	83.91
U. S. S. Lamson	48	0	0	85.40
U. S. S. McDermut	(1)			86.64
U. S. S. Twiggs	61	2	393.44	90.14
U. S. S. Preston	46	0	0	90.22
U. S. S. Tatnall	73	2	328.76	92.04
U. S. S. Breese	55	1	218.18	92.71
U. S. S. MacKenzie	104	2	230.76	96.28
U. S. S. Chase	99	2	242.42	97.16
U. S. S. Simpson	55	2	436.36	98.81
U. S. S. Zeilen	34	1	352.94	102.12
U. S. S. Bulmer	63	1	190.47	105.46
U. S. S. McCawley	(1)			107.62
U. S. S. Gillis	47	0	0	110.90
U. S. S. Mervine	105	1	114.28	111.11
U. S. S. Moody	(1)			117.26
U. S. S. Kilty	59	0	0	118.14
U. S. S. Evans	34	0	0	122.10
U. S. S. Morris	37	0	0	122.91
U. S. S. McCormick	57	0	0	125.00
U. S. S. Tingey	41	0	0	125.16
U. S. S. Buffalo	(1)			127.47
U. S. S. Philip	94	6	765.95	131.14
U. S. S. Thompson	64	0	0	133.20
U. S. S. Montgomery	58	2	413.79	138.56
U. S. S. Paul Hamilton	53	1	226.41	140.28
U. S. S. Bailey	42	0	0	150.34
U. S. S. Kennedy	102	2	235.29	151.07
U. S. S. Elliott	46	0	0	153.23
U. S. S. LaVallette	110	4	436.36	153.25
U. S. S. Birmingham	327	3	110.09	153.52
U. S. S. Ward	53	2	452.83	159.46
U. S. S. Henshaw	40	1	300.00	160.00
U. S. S. Mugford	(1)			163.88
U. S. S. DeLong	(1)			164.38
U. S. S. Yarnall	39	0	0	168.86
U. S. S. Farquhar	62	0	0	171.12
U. S. S. Aaron Ward	40	2	600.00	181.81
U. S. S. Delphy	65	0	0	190.47
U. S. S. Corry	109	2	220.18	195.51
U. S. S. William Jones	61	0	0	205.34
U. S. S. Jacob Jones	59	1	203.38	212.38
U. S. S. Wickes	52	0	0	234.69
U. S. S. Stoddert	64	2	375.00	239.13
U. S. S. Buchanan	49	0	0	239.78
U. S. S. Tarbell	42	0	0	254.09
U. S. S. Lea	35	0	0	306.05
U. S. S. Greer	40	1	300.00	335.95
U. S. S. Upshur	36	1	333.33	431.33
Miscellaneous.				
U. S. S. Eider	(1)			0
U. S. S. Lapwing	50	0	0	0
U. S. S. Navajo	(1)			0
U. S. S. Seagull	60	0	0	0
U. S. S. Pigeon	24	1	500.00	(2)
U. S. S. Burns	102	1	117.64	44.11
U. S. S. Anthony	101	1	118.81	52.45
U. S. S. Tern	49	1	244.89	53.45
U. S. S. Ingraham	109	0	0	69.68
U. S. S. Ludlow	100	0	0	70.64
U. S. S. Cuyama	106	3	339.62	70.68
U. S. S. Baltimore	380	0	0	72.30
U. S. S. Tanager	53	0	0	77.66
U. S. S. Whippoorwill	(1)			79.47
U. S. S. Vestal	404	2	59.40	89.01

[1] No report received for November.
[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

PACIFIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
U. S. S. Brant	45	0	0	89.71
U. S. S. Kingfisher	47	0	0	90.05
U. S. S. Nanshan	(1)			97.95
U. S. S. Neptune	172	1	69.76	99.90
U. S. S. Pinola	52	0	0	100.16
U. S. S. Cardinal	54	0	0	110.29
U. S. S. Aroostook	693	5	86.58	113.24
U. S. S. Rappahannock	257	2	93.38	113.79
U. S. S. Turkey	54	0		118.34
U. S. S. Stribling	95	3	378.94	118.42
U. S. S. Sproston	102	0	0	119.76
U. S. S. Glacier	155	1	77.41	123.07
U. S. S. Partridge	48	0	0	123.20
U. S. S. Kanawha	118	3	305.08	135.18
U. S. S. Eagle No. 11	35	1	342.85	147.88
U. S. S. Jason	240	0	0	147.88
U. S. S. Camden	632	2	37.97	151.18
U. S. S. Sonoma	58	0	0	151.18
U. S. S. Penguin	52	0	0	153.84
U. S. S. Connecticut	720	5	83.33	158.45
U. S. S. Mercy	293	2	81.91	184.56
U. S. S. Pelican	(1)			189.97
U. S. S. Rainbow	(1)			195.00
U. S. S. Frederick	394	8	243.65	204.87
U. S. S. Gannet	58	0	0	213.24
U. S. S. Thrush	50	0	0	230.03
U. S. S. Hancock	131	0	0	236.06
U. S. S. Swallow	54	0	0	512.35

ASIATIC FLEET.

Battleship and cruiser force.				
U. S. S. Albany	272	11	485.29	350.85
U. S. S. Huron	891	31	417.50	351.28
U. S. S. New Orleans	338	6	213.01	526.01
Destroyer force.				
U. S. S. Roper	121	0	0	117.43
U. S. S. Waters	122	0	0	135.84
U. S. S. Rathburn	(1)			152.34
U. S. S. Talbot	122	4	393.44	249.61
U. S. S. J. D. Edwards	(1)			253.07
U. S. S. Broome	(1)			257.83
U. S. S. Dorsey	(1)			265.25
U. S. S. Whipple	(1)			324.01
U. S. S. Panther	335	6	214.92	328.83
U. S. S. Chandler	(1)			257.54
U. S. S. Boric	(1)			391.30
U. S. S. Alden	98	1	122.44	416.37
U. S. S. Zane	108	2	222.22	433.91
U. S. S. Southard	115	1	104.34	475.63
U. S. S. Smith Thompson	(1)			478.56
U. S. S. Long	(1)			544.52
U. S. S. Barker	(1)			556.14
U. S. S. Tracy	(1)			561.06
U. S. S. Hovey	(1)			620.50
Miscellaneous.				
U. S. S. Ajax	61	0	0	0
U. S. S. Mohican	(1)			0
U. S. Submarine Base	30	0	0	(2)
U. S. S. Piscataqua	40	0	0	31.08
U. S. S. Celtic	(1)			61.22
U. S. S. General Alva	68	1	176.47	61.45
U. S. S. Wompatuck	39	0	0	77.17
U. S. S. Ontario	(1)			119.60
U. S. S. Abarenda	(1)			129.21
U. S. S. Sarah Thompson	85	1	141.17	181.22
U. S. S. Heron	53	7	1,584.90	207.34
U. S. S. Avocet	58	5	1,034.48	208.09
U. S. S. R. L. Barnes	(1)			235.29
U. S. S. Quiros	52	0	0	319.71
U. S. S. Rizal	112	1	107.14	362.81

[1] No report received for November.
[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

ASIATIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
U. S. S. Villalobas	58	4	827.58	382.55
U. S. S. Genesee	(1)	.....	.....	422.36
U. S. S. Bittern	45	5	1,333.33	424.02
U. S. S. Isabel	(1)	.....	.....	474.16
U. S. S. Elcano	(1)	.....	.....	503.86
U. S. S. Hart	92	1	130.43	517.05
U. S. S. Palos	(1)	.....	.....	602.40
U. S. S. Monocacy	47	1	255.31	611.76
U. S. S. Napa	(1)	.....	.....	635.76
U. S. S. Pampanga	36	1	333.33	659.68
U. S. S. Wilmington	195	16	984 61	676.22

UNASSIGNED, INCLUDING SHIPS ON SPECIAL DUTY.

Battleship and cruiser force.				
U. S. S. Ohio	418	6	172.24	146.22
Miscellaneous.				
U. S. S. Argonne	180	0	0	(2)
U. S. S. Falcon	80	0	0	84.15
U. S. S. Nitro	281	3	128.11	90.56
U. S. S. Gulfport	100	3	360.00	101.12
U. S. S. Quincy	99	0	0	105.72
U. S. S. Pyro	246	9	439.02	107.62
U. S. S. Caesar	82	2	292.68	108.98
U. S. S. Newport News	302	0	0	124.11
U. S. S. Kittery	120	2	200.00	129.96
U. S. S. Bath	110	1	109.09	153.71
U. S. S. Houston	163	8	588.95	154.69
U. S. S. Patoka	108	1	111.11	169.91
U. S. S. Pensacola	150	1	80.00	178.97
U. S. S. Orion	172	2	139.53	194.47
U. S. S. Henderson	447	9	241.61	198.30
U. S. S. Cormorant	60	5	1,000.00	211.53
U. S. S. Ramapo	131	1	91.60	221.86
U. S. S. Neches	124	3	290.32	223.85
U. S. S. Sapelo	99	1	121.21	230.56
U. S. S. Grebe	52	0	0	240.80
U. S. S. Alameda	92	2	260.86	252.14
U. S. S. Saturn	117	1	102.56	267.45
U. S. S. Trinity	110	3	327.27	295.30
U. S. S. Mars	142	3	253.52	415.35

U. S. MARINES ON FOREIGN SHORE SERVICE.

Eighth Regiment, First Provisional Brigade, Mirebalais, Haiti	(1)	.....	.....	228.27
Second Regiment, First Brigade, Cape Haitien, Haiti	731	15	246.23	358.27
Fourth Air Squadron, Port au Prince, Haiti	(1)	.....	.....	359.67
First Provisional Brigade, Port au Prince, Haiti	(1)	.....	.....	513.60
First Air Squadron, Santo Domingo, Dominican Republic	195	6	369.23	101.15
U. S. Marine Barracks Training Center, Santo Domingo, Dominican Republic	139	5	431.65	130.17
Fifteenth Regiment, Second Brigade, San Pedro de Macoris, Dominican Republic	834	11	158.27	143.19
Fourth Regiment, U. S. Marine Corps, Santo Domingo, Dominican Republic	(1)	.....	.....	241.80
Post Dispensary, Marine Barracks, St. Thomas, Virgin Islands	210	0	0	110.68
Naval and Marine Corps, graves registration service, Paris, France	(1)	.....	.....	55.55
U. S. Marine detachment, Camaguey, Cuba	304	3	118.42	197.71
U. S. Marine detachment, American Legation, Managua, Nicaragua	122	2	196.72	340.20
U. S. Marine detachment, American Legation, Peking, China	(1)	.....	.....	432.22

[1] No report received for November.
[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000, etc.*—Continued.

SUMMARY.

	Annual rate per 1,000, November.			Average rate since Jan. 1, 1921.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	0	130.70	1,584.90	0	151.59	1,023.36
Battleship and cruiser force:						
Atlantic Fleet	0	121.00	613.63	36.35	162.69	507.90
Pacific Fleet	22.09	95.76	199.24	66.31	130.74	139.77
Asiatic Fleet	213.01	383.74	485.29	350.85	355.83	526.01
Unassigned, including ships on special duty	172.24	172.24	172.24	146.22	187.94	146.22
Destroyer force:						
Atlantic Fleet	0	146.34	895.52	0	158.93	1,023.36
Pacific Fleet	0	104.16	774.19	0	85.27	431.33
Asiatic Fleet	0	164.54	393.44	117.43	391.04	620.50
Miscellaneous:						
Atlantic Fleet	0	113.81	931.03	0	121.10	332.01
Pacific Fleet	0	81.99	500.00	0	122.33	512.35
Asiatic Fleet	0	481.71	1,584.90	0	329.42	676.22
Unassigned, including ships on special duty	0	201.85	1,000.00	84.15	172.48	415.35

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASES.

	Per cent, November.		Per cent since Jan. 1, 1921.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	71.40	7.85	83.28	8.62
Battleship and cruiser force:				
Atlantic Fleet	60.47	10.08	57.61	9.27
Pacific Fleet	87.63	6.19	69.97	6.82
Asiatic Fleet	56.25	12.50	47.19	14.35
Unassigned, including ships on special duty	66.67	0	58.41	15.93
Destroyer force:				
Atlantic Fleet	73.61	2.78	69.30	6.98
Pacific Fleet	82.89	10.53	77.72	6.78
Asiatic Fleet	28.57	7.14	45.25	9.97
Miscellaneous:				
Atlantic Fleet	78.49	6.45	67.90	8.05
Pacific Fleet	80.95	4.76	66.91	7.12
Asiatic Fleet	58.14	16.28	52.95	12.40
Unassigned, including ships on special duty	63.33	10.00	64.19	9.46

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the four-week period Dec. 4, to Dec. 31, 1921, inclusive.*

VENEREAL DISEASES.

	Total admissions.	Annual rate per 1,000.	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000.
FIRST NAVAL DISTRICT.									
Boston, Mass., navy yard	2	49.24	21.15	0	.....	2	49.24	0	.....
Hingham, Mass., receiving ship and ammunition depot	6	152.04	94.75	3	76.02	1	25.34	2	50.68
Newport, R. I.:									
Naval torpedo station	1	16.04	23.89	0	.....	1	16.04	0	.....
Naval station [1]	0	12.03	.....	.....	.....	.....	.....	.....	.....
Portsmouth, N. H., navy yard, including naval prison	2	16.63	10.96	0	.....	2	16.63	0	.....

[1] Reports for the weeks ending Dec. 25 and Dec. 31, 1921, not received.

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations, etc.*—Continued.

VENEREAL DISEASES—Continued.

	Total admissions.	Annual rate per 1,000	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000.
THIRD NAVAL DISTRICT.									
Brooklyn, N. Y.:									
Headquarters, naval district	1	22.37	6.75	1	22.37	0	.....	0	.....
Navy yard, including marine barracks	2	56.89	33.74	0	.....	2	56.89	0	.....
Receiving ship (Bay Ridge)	8	64.31	47.80	0	.....	7	56.27	1	8.03
New London, Conn., naval submarine base	4	44.94	24.08	0	.....	4	49.91	0	.....
FOURTH NAVAL DISTRICT.									
Philadelphia, Pa.:									
Navy yard	3	121.87	34.04	0	.....	2	81.25	1	40.62
Receiving station	39	256.69	95.80	7	46.07	23	151.38	9	59.23
FIFTH NAVAL DISTRICT.									
Hampton Roads, Va.:									
Naval air station	9	132.49	51.73	3	44.16	6	88.33	0	.....
Naval training station	25	81.99	19.76	8	26.23	14	45.91	3	9.83
Receiving ship at naval base	6	100.51	89.83	0	.....	6	100.51	0	.....
Norfolk, Va., navy yard, including marine barracks	7	122.29	31.24	0	.....	4	69.88	3	52.41
Quantico, Va., marine barracks	37	167.94	38.56	3	13.61	34	154.32	0	.....
SIXTH NAVAL DISTRICT.									
Charleston, S. C.:									
Navy yard and marine barracks	4	192.56	25.92	0	.....	3	144.42	1	48.14
Receiving ship	3	76.92	84.88	0	.....	3	76.92	0	.....
Parris Island, S. C., marine barracks	5	28.54	15.60	1	5.70	4	22.83	0	.....
SEVENTH NAVAL DISTRICT.									
Key West, Fla., naval station	2	192.59	26.30	1	96.29	0	.....	1	96.29
EIGHTH NAVAL DISTRICT.									
New Orleans, La., naval station	3	260.00	81.88	1	86.66	2	173.33	0	.....
Pensacola, Fla., naval air station	13	181.32	72.38	3	41.84	9	125.53	1	13.94
NINTH NAVAL DISTRICT.									
Great Lakes, Ill., naval station	9	63.86	36.54	0	.....	4	28.38	5	35.48
ELEVENTH NAVAL DISTRICT.									
San Diego, Calif., naval air station	0	.....	11.43	0	.....	0	.....	0	.....
San Pedro, Calif., naval submarine base	8	90.19	45.89	0	.....	6	67.64	2	22.54
TWELFTH NAVAL DISTRICT.									
Mare Island, Calif., naval station	5	40.59	24.20	0	.....	5	40.59	0	.....
San Francisco, Calif., naval training station	8	56.21	31.03	3	21.08	3	21.08	2	14.05
THIRTEENTH NAVAL DISTRICT.									
Keyport, Wash., naval torpedo station	1	71.03	51.06	0	.....	1	71.03	0	.....
Puget Sound, Bremerton, Wash.:									
Navy yard, including marine barracks	1	28.32	11.01	0	.....	1	28.32	0	.....
Receiving ship	4	247.61	72.81	0	.....	3	185.70	1	61.90
Total	218	88.66	38.55	34	13.82	152	61.81	32	13.01

TABLE No. 4.—*Admissions to sick list and admission rates reported from various shore stations for the four-week period, Dec. 4 to Dec. 31, 1921, inclusive.*

DISEASES AND INJURIES.

	Complement.	Total admissions all causes.	Annual rate per 1,000.	Average rate since July 1.	Total admissions, communicable diseases, exclusive of influenza.	Annual rate per 1,000.	Average rate since July 1.
FIRST NAVAL DISTRICT.							
Boston, Mass., navy yard	528	21	517.04	209.60	0	.....	1.92
Hingham, Mass., receiving ship and ammunition depot	513	28	709.54	536.36	1	25.34	1.69
Newport, R. I.:							
Naval torpedo station	810	19	304.93	160.00	0	.....	3.11
Naval station [1]	437	2	59.49	378.12	0	.....	1.00
Portsmouth, N. H., navy yard, including marine barracks	1,563	35	291.09	134.80	1	8.31	.64
THIRD NAVAL DISTRICT.							
Brooklyn, N. Y.:							
Headquarters, naval district	581	5	111.87	65.87	0	.....	0
Navy yard, including marine barracks	457	30	853.38	221.44	0	.....	0
Receiving ship	1,617	71	570.76	436.24	0	.....	3.98
New London, Conn., naval submarine base	1,157	34	381.99	343.42	0	.....	1.78
FOURTH NAVAL DISTRICT.							
Philadelphia, Pa.:							
Navy yard	320	8	325.00	185.70	0	.....	0
Receiving station	1,975	185	1,217.67	354.68	0	.....	2.53
FIFTH NAVAL DISTRICT.							
Hampton Roads, Va.:							
Naval air station	883	40	588.88	261.53	1	14.72	5.74
Naval training station	3,964	191	626.40	180.65	2	6.55	8.13
Receiving ship at naval base	776	43	720.33	447.76	1	16.75	8.55
Norfolk, Va., navy yard and marine barracks	744	24	419.28	138.38	0	.....	4.46
Quantico, Va., marine barracks	2,864	131	594.60	334.42	1	4.53	17.84
SIXTH NAVAL DISTRICT.							
Charleston, S. C.:							
Navy yard and marine barracks	270	6	288.84	88.87	0	.....	0
Receiving ship	507	16	410.27	235.80	0	.....	21.22
Parris Island, S. C., marine barracks	2,277	23	131.30	73.75	1	5.70	.94
SEVENTH NAVAL DISTRICT.							
Key West, Fla., naval station	135	10	962.96	523.75	0	.....	0
EIGHTH NAVAL DISTRICT.							
New Orleans, La., naval station	150	6	520.00	371.90	0	.....	58.00
Pensacola, Fla., naval air station	932	38	530.02	316.79	1	13.94	8.39
NINTH NAVAL DISTRICT.							
Great Lakes, Ill., naval station	1,832	82	581.87	314.55	3	21.28	38.19
ELEVENTH NAVAL DISTRICT.							
San Diego, Calif., naval air station	1,216	29	340.01	233.66	0	.....	.81
San Pedro, Calif., naval submarine base	1,153	23	259.30	176.19	1	11.27	6.55
TWELFTH NAVAL DISTRICT.							
Mare Island, Calif., naval station	1,601	59	479.02	166.73	0	.....	.33
San Francisco, Calif., naval training station	1,850	141	990.80	385.03	3	21.08	24.19
THIRTEENTH NAVAL DISTRICT.							
Keyport, Wash., naval torpedo station	183	4	284.14	204.24	0	.....	0
Puget Sound, Bremerton, Wash.:							
Navy yard, including marine barracks	159	1	28.32	11.01	0	.....	0
Receiving ship	210	5	309.51	116.49	0	.....	4.85
Total	31,964	1,310	532.77	284.02	16	6.50	10.55

[1] Report for the weeks ending Dec. 25, and Dec. 31, 1921, not received.

TABLE No. 4 (Contd.)—*Communicable diseases reported from the above listed stations for the four-week period, Dec. 4 to Dec. 31, 1921, inclusive.*

CEREBROSPINAL FEVER.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.02

DIPHTHERIA.

Total admissions	1
Annual rate per 1,000	.40
Average rate since July 1	.21
Incidence: Naval station, Great Lakes, Ill	1

MALARIA.

Total admissions	3
Annual rate per 1,000	1.22
Average rate since July 1	3.75
Incidence:	
Receiving ship, Hingham, Mass	1
Marine Barracks, Parris Island, S. C.	1
Air station, Pensacola, Fla	1

GERMAN MEASLES.

Total admissions	1
Annual rate per 1,000	.40
Average rate since July 1	1.01
Incidence: Training station, Hampton Roads, Va	1

MEASLES.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.34

MUMPS.

Total admissions	3
Annual rate per 1,000	1.22
Average rate since July 1	3.64
Incidence:	
Receiving ship, Hampton Roads, Va	1
Naval station, Great Lakes, Ill	1
Training station, San Francisco, Calif	1

PNEUMONIA.

Total admissions	3
Annual rate per 1,000	1.22
Average rate since July 1	.66
Incidence:	
Marine barracks, Quantico, Va	1
Submarine base, San Pedro, Calif	1
Training station, San Francisco, Calif	1

SCARLET FEVER.

Total admissions	1
Annual rate per 1,000	.40
Average rate since July 1	.26
Incidence: Training station, Hampton Roads, Va	1

TUBERCULOSIS.

Total admissions	4
Annual rate per 1,000	1.62
Average rate since July 1	.58
Incidence:	
Navy yard, Portsmouth, N. H	1
Air station, Hampton Roads, Va	1
Naval station, Great Lakes, Ill	1
Training station, San Francisco, Calif	1

INFLUENZA.

Total admissions	16
Annual rate per 1,000	6.50
Average rate since July 1	5.19
Incidence:	
Headquarters, Brooklyn, N. Y.	1
Receiving station, Philadelphia, Pa	1
Training station, Hampton, Roads, Va	8
Receiving ship, Hampton Roads, Va	1
Navy yard, Norfolk, Va	1
Submarine base, San Pedro, Calif	4

TYPHOID FEVER.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.02

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the four-week period, Dec. 4 to Dec. 31, 1921.*

Hospital.	Diphtheria.		Malaria.		German measles.		Measles.		Mumps.		Pneumonia.	
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.
Annapolis											1	1
Charleston												3
Chelsea											1	1
Great Lakes	1	1							1	1	1	
League Island			1	1			1				4	3
Mare Island									1		2	1
Newport											1	
New York			2	5		1	1	1			4	1
Norfolk			10	18	1	1	1		1	1	2	1
Pensacola				1								
Portsmouth											1	1
Puget Sound							2	2				
Quantico												1
San Diego			1	3	1		1				3	1
Washington	1	1		1			1	1			2	1
Total	2	2	13	29	2	2	7	4	3	2	22	15

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the four-week period, Dec. 4 to Dec. 31, 1921*—Continued.

Hospital.	Scarlet fever.		Tuberculosis.		Influenza.		Smallpox.		All causes.		
	Under treatment.	Admitted.	Under treatment.	Admitted	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Discharged.
Annapolis			1			4			34	58	78
Charleston		1							228	169	145
Chelsea									429	217	231
Great Lakes			1	1		1			454	365	176
Key West									8	15	12
League Island			1	3		2			299	295	313
Mare Island			16	21	2	2			332	193	202
Newport			2						62	24	30
New York			13	8		9			554	467	452
Norfolk	1		11	2		1	1	1	261	229	222
Parris Island									32	27	27
Pensacola									34	33	47
Portsmouth			5	2	1	1			32	30	40
Puget Sound									85	77	68
Quantico						2			61	60	55
San Diego			5	1	3	1			237	220	280
Washington			1						268	184	178
Total	1	1	56	38	6	23	1	1	3,410	2,663	2,556

TABLE No. 6.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the 4-week period Dec. 4 to Dec. 31. 1921, inclusive.*

Classes.	Navy (complement 110,577).		Marine Corps (complement 22,761).		Total (complement 133,338).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of the blood	1	0.12	0		1	0.10
Diseases of circulatory system	31	3.64	8	4.57	39	3.80
Diseases of digestive system	391	45.97	133	75.96	524	51.08
Diseases of the ductless glands and spleen	2	.24	0		2	.19
Diseases of ear	78	9.17	14	8.00	92	8.97
Diseases of eye, and adnexa	36	4.23	11	6.28	47	4.58
Diseases of genito-urinary system (non-venereal)	167	19.63	28	15.99	195	19.01
Communicable diseases transmissible by oral and nasal discharges	129	15.17	11	6.28	140	13.65
Communicable diseases transmissible by intestinal discharges	2	.24	1	.57	3	.29
Communicable diseases transmissible by insects and other arthropods	69	8.11	369	210.75	438	42.70
Tuberculosis (all forms)	22	2.59	8	4.57	30	2.92
Venereal diseases	975	114.62	308	175.91	1,283	125.08
Other diseases of infective type	221	25.98	95	54.26	316	30.81
Diseases of lymphatic system	54	6.35	18	10.28	72	7.02
Diseases of mind	21	2.47	4	2.28	25	2.44
Diseases of motor system	72	8.46	23	13.14	95	9.26
Diseases of nervous system	43	5.06	5	2.86	48	4.68
Diseases of respiratory system	787	92.51	140	79.96	927	90.37
Diseases of skin, hair, and nails	75	8.82	25	14.28	100	9.75
Hernia	43	5.06	14	8.00	57	5.56
Miscellaneous diseases and conditions	85	9.99	21	11.99	106	10.33
Parasites (fungi and certain animal parasites)	104	12.23	29	16.56	133	12.97
Tumors	6	.71	2	1.14	8	.78
Injuries	427	50.20	90	51.40	517	50.40
Poisons	22	2.59	13	7.42	35	3.41
Total	3,863	454.13	1,370	782.48	5,233	510.17

TABLE No. 7.—*Number of admissions reported by Form F cards for certain communicable diseases and annual rates per 1,000 for the 4-week period Dec. 4 to Dec. 31, 1921, inclusive.*

Diseases	Navy (complement 110,577).		Marine Corps (complement 22,761).		Total (complement 133,338).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 8:						
Chicken pox	11	1.29	1	0.57	12	1.17
Diphtheria	4	.47	0	.....	4	.39
German measles	2	.24	0	.....	2	.19
Influenza	74	8.70	4	2.28	78	7.60
Measles	1	.12	4	2.28	5	.49
Mumps	4	.47	0	.....	4	.39
Pneumonia, broncho	7	.82	0	.....	7	.68
Pneumonia, lobar	11	1.29	2	1.14	13	1.27
Scarlet fever	5	.59	0	.....	5	.49
Class 9:						
Dysentery, entamebic	2	.24	1	.57	3	.29
Class 10:						
Dengue	30	3.53	107	61.11	137	13.36
Malaria	39	4.58	262	149.64	301	29.34
Class 11:						
Tuberculosis (all forms)	22	2.59	8	4.57	30	2.92
Class 12:						
Chancroid	199	23.39	89	50.83	288	28.08
Gonococcus infection	654	76.88	183	104.52	837	81.60
Syphilis	122	14.34	36	20.56	158	15.40
Total	1,187	139.54	697	398.09	1,884	183.67

TABLE No. 8.—*Deaths reported, entire Navy, for the 4-week period Dec. 4 to Dec. 31, 1921, inclusive.*

Causes.	Navy (complement 110,577).	Marine Corps (complement 22,761).	Total (complement 133,338).
Pneumonia, broncho	1	0	1
Pneumonia, lobar	2	1	3
Tuberculosis, chronic, pulmonary	1	0	1
Tuberculosis, other forms	1	0	1
Scarlet fever	1	0	1
Malignant growths	3	0	3
Other diseases	4	2	6
Drowning	1	0	1
Other accidents and injuries	7	0	7
Total	21	3	24
Annual death rate per 1,000, all causes	2.5	1.7	2.3
Annual death rate per 1,000, diseases only	1.5	1.7	1.6

ORDERS ISSUED TO MEDICAL AND DENTAL OFFICERS AND NURSES.

DECEMBER 12, 1921:

Lieutenant Commander M. J. Aston, Medical Corps, U. S. Navy. Detached navy yard, Philadelphia, Pa., to duty U. S. S. *Shawmut*.

DECEMBER 13, 1921:

Lieutenant Commander F. H. Bowman, Medical Corps, U. S. Navy. Placed on retired list of U. S. Navy to home.

Lieutenant Commander W. B. Turner, Medical Corps, U. S. Navy. Detached U. S. S. *Kansas* to duty U. S. S. *Michigan*.

DECEMBER 13, 1921—Continued.

Lieutenant Commander W. W. Wickersham. Detached U. S. S. *Shawmut* to navy yard, Philadelphia, Pa.

Lieutenant C. W. Colonna, Medical Corps, U. S. Navy. Detached Destroyer Squadrons Pacific Fleet to duty U. S. S. *Arizona*.

Lieutenant J. B. Farrior, Medical Corps, U. S. Navy. Detached U. S. S. *Arizona* to Destroyer Squadrons Pacific Fleet.

Lieutenant B. Groesbeck, Medical Corps, U. S. Navy. Detached Receiving Barracks, Hampton Roads, Va., to duty naval hospital, League Island, Philadelphia, Pa.

Lieutenant L. B. Sartin, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to U. S. S. *Rapidan*.

DECEMBER 14, 1921:

Commander E. P. Huff, Medical Corps, U. S. Navy. Detached U. S. S. *Mercy* to duty U. S. S. *California*.

Commander C. B. Munger, Medical Corps, U. S. Navy. Detached U. S. S. *California* to duty U. S. S. *Mercy*.

Commander G. B. Trible, Medical Corps, U. S. Navy. Detached U. S. S. *Relief* to home to wait orders.

Lieutenant Commander J. M. Quinn, Medical Corps, U. S. Navy. Placed on retired list of U. S. Navy.

DECEMBER 16, 1921:

Commander S. L. Higgins, Medical Corps, U. S. Navy. Detached U. S. S. *Mercy* to duty U. S. S. *New Mexico*.

Commander R. E. Stoops, Medical Corps, U. S. Navy. Detached U. S. S. *New Mexico* to duty naval hospital, Pearl Harbor, Hawaii.

Lieutenant W. H. Harrell, Medical Corps, U. S. Navy. Detached U. S. S. *Mars* to duty U. S. S. *Laramie*.

Lieutenant H. C. Kellers, Medical Corps, U. S. Navy. Detached naval hospital, Charleston, S. C., to duty U. S. S. *Salinas*.

DECEMBER 17, 1921:

Commander H. F. Strine, Medical Corps, U. S. Navy. Resignation accepted, effective February 10, 1922.

Lieutenant J. P. Bowles, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to Naval Training Station, Newport, R. I.

Lieutenant C. A. Broaddus, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to naval hospital, Washington, D. C.

Lieutenant D. P. Platt, Medical Corps, U. S. Navy. Detached receiving barracks, Hampton Roads, to naval hospital, Charleston, S. C.

Lieutenant F. W. Quin, Medical Corps, U. S. Navy. Detached naval hospital, Chelsea, Mass., to Marine Expeditionary Force, Haiti.

Lieutenant J. D. Rives, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to naval hospital, Norfolk, Va.

Lieutenant (junior grade) F. T. Barker, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to Destroyer Squadron, Atlantic Fleet.

Lieutenant (junior grade) D. D. Bullock, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to naval hospital, Parris Island, S. C.

Lieutenant (junior grade) C. J. Flotte, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to receiving ship, Philadelphia, Pa.

DECEMBER 19, 1921:

Lieutenant Commander W. O. Bailey, Medical Corps, U. S. Navy. Orders October 3, 1921, revoked.

Lieutenant Commander J. G. Ziegler, Medical Corps, U. S. Navy. To duty naval hospital, Washington, D. C. Additional duty St. Elizabeths Hospital.

Lieutenant S. J. Kinkaid, Medical Corps, U. S. Navy. Detached naval operating base, Hampton Roads, Va., to naval dispensary, Navy Yard, Philadelphia, Pa.

Lieutenant E. F. McCall, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to U. S. S. *Canopus*.

Lieutenant E. F. Mullaly, Medical Corps, U. S. Navy. To additional duty naval receiving station, Seattle, Wash.

Lieutenant J. T. O'Connell, Medical Corps, U. S. Navy. Detached naval hospital, Washington, D. C., to U. S. S. *Delaware*.

Lieutenant F. Sabiston, Medical Corps. U. S. Navy. Detached U. S. S *Gulfport* to U. S. S. *Capella*.

DECEMBER 20, 1921:

Lieutenant Commander W. H. Whitmore, Medical Corps, U. S. Navy. Upon discharge treatment, naval hospital, New York, to Naval Air Station, Pensacola, Fla.

Lieutenant J. G. Davis, Medical Corps, U. S. Navy. Detached naval receiving station, Seattle, Wash., to U. S. S. *Sepulga*.

Lieutenant L. E. Mueller, Medical Corps, U. S. Navy. Detached Division 39, Destroyer Squadron, Atlantic Fleet, to await orders.

DECEMBER 21, 1921:

Lieutenant C. W. Lane, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to naval hospital, League Island, Pa.

Lieutenant W. T. Lineberry, Medical Corps, U. S. Navy. Detached Navy recruiting station, Houston, Tex., to Navy recruiting station, Dallas, Tex.

Lieutenant B. E. McDonald, Medical Corps, U. S. Navy. To additional duty Navy recruiting station, Houston, Tex.

Lieutant C. N. Meador, Medical Corps, U. S. Navy. Detached naval hospital, Mare Island, Calif., resignation accepted February 1, 1922.

Lieutenant W. H. O'Connor, Medical Corps, U. S. Navy. Detached U. S. S. *Alameda* to U. S. S. *Kaweah*.

DECEMBER 23, 1921:

Commander C. K. Winn, Medical Corps, U. S. Navy. Detached naval hospital, Norfolk, Va., to duty naval hospital, New York, N. Y.

Lieutenant Commander L. M. Schmidt, Medical Corps, U. S. Navy. To duty naval hospital, Norfolk, Va.

Lieutenant J. W. Daugherty, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to U. S. S. *Procyn*.

DECEMBER 24, 1921:

Lieutenant Commander L. W. Johnson, Medical Corps, U. S. Navy. Detached naval hospital, Mare Island, Calif., to U. S. S. *Mercy*.

Lieutenant S. S. Cooke, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, to naval hospital, Chelsea, Mass.

Lieutenant W. F. Kennedy, Medical Corps, U. S. Navy. Detached U. S. S. *Delaware* to treatment naval hospital, Boston, Mass.

Lieutenant F. F. Lane, Medical Corps, U. S. Navy. Detached Navy recruiting station, Wilkes-Barre, Pa., to naval hospital, League Island, Pa.

Lieutenant G. U. Pillmore, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., granted sick leave of absence.

DECEMBER 24, 1921—Continued.

Lieutenant D. P. Platt, Medical Corps, U. S. Navy. Detached receiving barracks, Hampton Roads, Va., to duty naval hospital, New York, N. Y.

Lieutenant E. A. Sharp, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, to naval hospital, Chelsea, Mass.

Lieutenant (junior grade) R. M. Cochrane, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to duty naval hospital, New York, N. Y.

December 28, 1921:

Lieutenant Commander J. A. Bass, Medical Corps, U. S. Navy. Detached U. S. S. *Columbia* to duty naval hospital, Charleston, S. C.

Lieutenant Commander G. L. Crain, Medical Corps, U. S. Navy. Detached Marine Expeditionary Force, Port-au-Prince, Haiti, to assistant sanitary engineer, of Haiti.

Lieutenant Commander R. F. Sheehan, Medical Corps, U. S. Navy. Detached U. S. S. *Wright* to treatment naval hospital, New York, N. Y.

Lieutenant Commander H. A. Tribou, Medical Corps, U. S. Navy. Detached U. S. S. *St. Louis* to duty U. S. S. *Wright*.

Lieutenant C. B. Brown, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to duty with Marine Corps Detached Guard Co., Hoboken, N. J.

Lieutenant K. S. Caldwell, Medical Corps, U. S. Navy. Placed on retired list of U. S. Navy.

Lieutenant J. C. W. Taylor, Medical Corps, U. S. Navy. Detached naval dispensary, Washington, D. C., to duty naval hospital, Charleston, S. C.

Lieutenant D. C. Thompson, Medical Corps, U. S. Navy. Placed on retired list of U. S. Navy.

December 29, 1921:

Commander A. Stuart, Medical Corps, U. S. Navy. Detached navy yard, Boston, Mass., to duty naval recruiting station, New York, N. Y.

Lieutenant R. E. S. Kelley, Medical Corps, U. S. Navy. Detached Public Health Service hospital, Fort Lyon, Colo., to marine recruiting station, Denver, Colo.

Lieutenant R. B. Team, Medical Corps, U. S. Navy. Detached U. S. S. *Ohio* to naval hospital, Chelsea, Mass.

December 30, 1921:

Lieutenant L. E. Mueller, Medical Corps, U. S. Navy. To duty marine recruiting station, St. Paul, Minn.

Lieutenant A. R. Schier, Medical Corps, U. S. Navy. Detached marine recruiting station, St. Paul, Minn., to duty naval hospital, Great Lakes, Ill.

Lieutenant W. R. Taylor, Medical Corps, U. S. Navy. Detached duty with Naval Rigid Airship Detachment, Howden, East Yorkshire, England, to United States and wait orders.

December 31, 1921:

Lieutenant P. S. Sullivan, Medical Corps, U. S. Navy. Detached navy yard, Portsmouth, N. H., to duty naval dispensary, Washington, D. C.

JANUARY 3, 1922:

Lieutenant Commander G. F. Cottle, Medical Corps, U. S. Navy. Detached receiving barracks, Hampton Roads, Va., to duty naval hospital, New York, N. Y.

Lieutenant C. V. Rault, Dental Corps, U. S. Navy. Detached Marine Expeditionary Force, Haiti, to duty navy yard, Philadelphia, Pa.

Lieutenant W. H. Wood, Dental Corps, U. S. Navy. Detached navy yard, Boston, Mass., revocation of appointment effective December 31, 1921.

ANUARY 5, 1922:

Lieutenant Commander E. W. Brown, Medical Corps, U. S. Navy. Detached naval hospital, Chelsea, Mass., to U. S. S. *Ohio*.

Lieutenant Commander H. McDonald, Medical Corps, U. S. Navy. Detached U. S. S. *Prairie* to duty U. S. S. *Camden*.

Lieutenant H. C. Johnston, Medical Corps, U. S. Navy. Detached naval training station, San Francisco, Calif., to duty U. S. S. *Chaumont*.

Lieutenant R. K. Joslin, Medical Corps, U. S. Navy. Detached U. S. S. *San Francisco* to duty U. S. S. *Ohio*.

Lieutenant C. D. Miller, Medical Corps; U. S. Navy. Detached marine barracks, Quantico, Va., to treatment naval hospital, Washington, D. C.

Lieutenant F. G. Speidel, Medical Corps, U. S. Navy. Detached U. S. S. *Chaumont* to receiving ship, San Francisco, Calif.

Lieutenant W. J. Pennell, Medical Corps, U. S. Navy. Detached Navy recruiting station, Syracuse, N. Y., to duty naval hospital, Newport, R. I.

Lieutenant Commander J. W. Crandall, Dental Corps, U. S. Navy. Detached navy yard, Philadelphia, Pa., to Marine Expeditionary Force, Santo Domingo.

Lieutenant Commander A. F. McCreary, Dental Corps, U. S. Navy. Detached Marine Expeditionary Force, Santo Domingo, to duty naval training station, Hampton Roads, Va.

Lieutenant W. C. Carroll, Dental Corps, U. S. Navy. Detached marine barracks, Quantico, Va., to Marine Expeditionary Force, Port au Prince, Haiti.

ANUARY 6, 1922:

Lieutenant Commander F. M. Harrison, Medical Corps, U. S. Navy. Detached naval hospital, Great Lakes, Ill., resignation accepted January 15, 1922.

Lieutenant C. Mack, Dental Corps, U. S. Navy. Detached U. S. S. *Pennsylvania* to duty naval dispensary, Washington, D. C.

ANUARY 7, 1922:

Lieutenant Commander E. W. Brown, Medical Corps, U. S. Navy. Detached U. S. S. *Ohio* to duty naval hospital, Chelsea, Mass.

Lieutenant Commander R. Cuthbertson, Medical Corps, U. S. Navy. Detached U. S. S. *Mercy* to receiving ship, New York, N. Y.

Lieutenant W. R. Angell, Medical Corps, U. S. Navy. To Squadron Medical Officer, Squadron 14.

Lieutenant W. P. Blake, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., to course instruction Mayo Foundation, Rochester, Minn.

Lieutenant J. E. Fetherson, Medical Corps, U. S. Navy. Detached U. S. S. *Olympia* to U. S. S. *Argonne*.

Lieutenant R. K. Joslin, Medical Corps, U. S. Navy. Detached U. S. S. *Ohio* to duty naval hospital, League Island, Pa.

Lieutenant J. C. Kimball, Medical Corps, U. S. Navy. Detached U. S. S. *Argonne* to U. S. S. *Olympia*.

Lieutenant P. H. MacInnis, Dental Corps, U. S. Navy. Detached U. S. S. *Camden* to navy yard, Portsmouth, N. H.

ANUARY 9, 1922:

Lieutenant Commander J. O. Downey, Medical Corps, U. S. Navy. Detached Navy recruiting station, New York, to observation naval hospital, New York, N. Y.

JANUARY 9, 1922—Continued.

Lieutenant Commander G. R. W. French, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington. D. C., January 24, 1922. to Edgewood Arsenal, Edgewood, Md.

Lieutenant W. P. Dey, Medical Corps, U. S. Navy. Detached naval hospital, Norfolk. Va., to duty Sixteenth Naval District.

Lieutenant A. R. Gleitsman, Dental Corps, U. S. Navy. Detached U. S. S. *St. Louis* to U. S. S. *Shawmut*.

JANUARY 10, 1922:

Lieutenant E. F. Slater. Medical Corps, U. S. Navy. Detached Fifth Regiment of Marines, Quantico, Va., to duty Ninth Company, Tenth Regiment of Marines.

Lieutenant F. E. Tierney, Medical Corps, U. S. Navy. Detached squadron medical officer, Spuadron Nine, to squadron medical officer, Squadron 15.

The following nurses have been appointed and assigned at the naval hospitals at the stations indicated—

Chelsea, Mass.

Phelps, Josephine A., from Hartford, Conn.

Mathews, Gertrude E., from Somerville, Mass.

Great Lakes, Ill.

Kane, Marie J., from St. Louis, Mo.

League Island, Pa.

McGinn, Mary J., from Philadelphia, Pa.

Kinsey, Myrtle N., from Erie, Mich.

New York, N. Y.

Broderick, Anna V., from Troy, N. Y.

Kingston, Harriet E., from Buffalo, N. Y.

New York, N. Y.—Continued.

Paulsen, Pauline J., from Brooklyn, N. Y.

Rennie, Georgianna, from Elmira, N. Y.

Portsmouth, Va.

James, Anna May, from Scranton, Pa.

Watkins, Neile L., from Chicago, Ill.

Gallagher, Jane M., from Fairview, N. J.

Puget Sound, Wash.

Kellam, Maude, from Aberdeen, Wash.

Washington, D. C.

Huber, Mary Louise, from Cleveland, Ohio.

Laurenson, Williamina M., from Fall River, Mass.

The following nurse, United States Naval Reserve Force, has been recalled to duty from inactive status—

Washington, D. C.

Kessler, Martha J., from Milwaukee, Wis.

The following nurses have been transferred to—

Annapolis, Md.

Markley, Veta Blanche, from League Island, Pa.

Chelsea, Mass.

Hopkins, Elizabeth S. (chief nurse), from Newport, R. I.

League Island, Pa.

Anderson, Lillie M., from Pensacola, Fla.

Mare Island, Calif.

Pipher, Minnie C., from Puget Sound, Wash.

Mare Island, Calif.—Continued.

Sanderson, Bess C., from Puget Sound, Wash.
Martin, Eleanor B., from Fort Lyon, Colo.
Torgeson, Mabelle S., from Fort Lyon, Colo.

Fort Lyon, Colo.

Wertz, Rosa Clifton, from Great Lakes, Ill.
Hamilton, Annie Galt, from Great Lakes, Ill.

New York, N. Y.

Mentzer, Ruth B., from Washington, D. C.

Portsmouth, Va.

Riley, Olive I., from U. S. S. *Relief.*
Thompson, Caroline M., from U. S. S. *Relief.*

San Diego, Calif.

Woods, Mary Rachel, from Fort Lyon, Colo.
Worthington, Cora Lee, from Fort Lyon, Colo.
Gibson, Laura M., from Fort Lyon, Colo.
Leighton, Anna, from Fort Lyon, Colo.

St. Thomas, V. I.

Coonan, Julia T. (chief nurse), from Brooklyn, N. Y.

Washington, D. C.

Donaldson, Inez (chief nurse), from Pharmacist's Mates' School, Portsmouth, Va.
McKay, Marion, from Newport, R. I.
Pond, Florence Grace, from Newport, R. I.

U. S. S. "Relief."

Mapes, Daisy M., from League Island, Pa.
Carver, Myrtle I., from Portsmouth, Va.

U. S. S. "Mercy."

Bunty, Helen M., from Mare Island, Calif.
Connor, Loretta V., from Mare Island, Calif.
Gommel, Mabel H., from Mare Island, Calif.
Kelleher, Norah, from Mare Island, Calif.

U. S. S. "Argonne" (temporary duty).

Hamlin, Mary V. (chief nurse), from Navy Yard, Philadelphia, Pa.
Treuthart, Nellie E., from League Island, Pa.

Honorable discharges.

Bowditch, Leah Louise, December 24, 1921, Chelsea, Mass.
Craney, Emily J., January 8, 1922, New York, N. Y.
Davis, Evelyn M., January 8, 1922, New York, N. Y.
Skinner, Florence M., December 2, 1921, Washington, D. C.

Resignations.

Ford, Ferol, December 29, 1921, Fort Lyon, Colo.
Nelson, Thecla E., December 31, 1921, Great Lakes, Ill.
Ballard, Anna Victoria, January 11, 1922, Mare Island, Calif.
Corbett, Josephine L., January 10, 1922, Portsmouth, Va.
Hernan, Lucy M. G., January 9, 1922, Fort Lyon, Colo.
Ryan, Josephine T., January 6, 1922, Portsmouth, Va.

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VOL. XVI NO. 3

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NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR
MEDICAL CORPS, U. S. NAVY

MARCH, 1922
(MONTHLY)

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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1, January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918.
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TABLE OF CONTENTS.

	Page.
PREFACE	v
NOTICE TO SERVICE CONTRIBUTORS	vi
SPECIAL ARTICLES:	
REVACCINATION AGAINST SMALLPOX AND A DISCUSSION OF IMMUNITY FOLLOWING COWPOX VACCINATION. By Lieutenant E. Peterson, Medical Corps, U. S. N	411
SOME ELEMENTS OF LEADERSHIP. By Colonel E. L. Munson, Medical Corps, U. S. N	433
HYPERTHYROIDISM. By Commander T. W. Reed, Medical Corps, U. S. N	454
HISTORICAL:	
THE HISTORY OF ANESTHESIA IN AMERICA. By Captain J. S. Taylor, Medical Corps, U. S. N	461
A HISTORY OF BLOOD TRANSFUSION. By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N	465
EDITORIAL:	
ON EDUCATION FOR OUR IDLE HOURS. ON LINE OF DUTY	477
SUGGESTED DEVICES:	
THE TECHNIQUE OF MAKING AND STAINING FROZEN SECTIONS. By Lieutenant Commander J. Harper, Medical Corps, U. S. N	481
CLINICAL NOTES:	
NEUROSYPHILIS. By Lieutenant Commander H. Butts and Lieutenant W. M. Alberty, Medical Corps, U. S. N	483
TREATMENT OF SURGICAL ULCERS OF STOMACH AND DUODENUM. By Lieutenant Commander J. J. A. McMullin, Medical Corps, U. S. N	497
FOREIGN BODY IN THE RIGHT LOWER BRONCHUS. By Lieutenant J. W. Green, Medical Corps, U. S. N	506
PROGRESS IN MEDICAL SCIENCES:	
GENERAL MEDICINE.—Treatment of gastric ulcer.—Meningococcus infection.—Syphilis of the heart.—Standard of cure in gonorrhea.—Provocative procedures in diagnosis of syphilis.—Intraspinal treatment of neurosyphilis.—Dissemination of spirochæta pallida from the primary focus of infection.—Abdominal syphilis.—Pulmonary syphilis.—Diagnosis and treatment of early syphilis.—Reinfection and curability in syphilis.—Local and general spirochætosis.—Use of arsphenamine in nonsyphilitic diseases.—Prophylaxis of syphilis with arsphenamine	509
SURGERY.—Epitheliomata of thymic origin.—Surgical treatment of epithelioma of the lip.—Light and heat treatment of epididymitis	521
TROPICAL MEDICINE.—Recent progress in medical zoology.—Intravenous injection of antimony tartrate in bilharzia disease.—Complexion of malaria cases.—Standard treatment of malaria	524

PROGRESS IN MEDICAL SCIENCES—Continued. Page.

PHYSIOLOGICAL CHEMISTRY.—Determination of the basal metabolism from the carbon-dioxide elimination.—Supplementary values of proteins.—Studies in the vitamine content.—Sampling bottle for gas analysis.—Fat-soluble vitamine.—Effect of hydrochloric acid ingestion upon composition of urine in man 530

EYE, EAR, NOSE, AND THROAT.—Conditions predisposing to hemorrhage in tonsil operations.—Statistical record of serious and fatal hemorrhage following operation on the tonsil 540

NOTES AND COMMENTS:

Tenth revision of the United States Pharmacopœia.—Vaccine in the prevention of pneumonia.—Three old books.—Removal of stains from wash goods.—Health of the French Mediterranean fleet during the war.—Treatment of poisoning due to the venom of a snake.—Annual health report of the German Navy 543

NURSE CORPS 561

DIGEST OF DECISIONS 567

BOOK NOTICES 569

QUERIES 572

PREVENTIVE MEDICINE, STATISTICS, LETTERS, ORDERS, NEW LEGISLATION, MOVEMENTS OF OFFICERS AND NURSES 574

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc. All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.*

U. S. NAVAL MEDICAL BULLETIN

VOL. XVI. MARCH, 1922. No. 3.

SPECIAL ARTICLES.

REVACCINATION AGAINST SMALLPOX AND A DISCUSSION OF IMMUNITY FOLLOWING COWPOX VACCINATION.

By E. PETERSON, Lieutenant, Medical Corps, United States Navy.

It is with a certain amount of trepidation that the writer enters upon a discussion of the complicated subject of immunity. Prevalent opinions on this subject, however, are so divergent in their conceptions and explanations that even a discussion of the kind intended in this paper may not be entirely uncalled for.

In a preliminary report in "Notes on preventive medicine for medical officers, United States Navy" (1) a résumé was given of the work done in connection with the revaccination of more than 5,000 men at the United States Naval Training Station, Great Lakes, Ill. Attempts were made to get as complete a record of every man as was possible. The factors on which most stress was laid in this regard were the history of his previous vaccination and his reaction to the present vaccination, observations being made at the end of 48 hours and a week. Any one familiar with the work at a training station can realize that reinspections of this nature are not easily accomplished. However, due to the hearty cooperation of the commandant, executive officer, and the officers in command of the various regiments and departments a very satisfactory result was obtained. In this connection I would also like to express my appreciation for the extreme interest shown by Pharmacist B. F. Lindsley, U. S. N.; Chief Pharmacist's Mate A. R. Albrecht, U. S. N.; and R. H. Stone, Ph. M., second class, U. S. N., in rendering valuable assistance.

History.—A statement was obtained from each individual as to when he had had the last positive reaction to cowpox vaccination. These statements were in no way checked up except as to the actual presence of the scar. The accompanying tables show the divisions made as to time elapsed.

Technique.—The technique used in vaccination was a combination of the incision and puncture methods in order to bring out, as far as possible, a distinct picture of the immediate reaction. The ordinary round needles supplied by the "trade" were used.

The arm to be vaccinated was thoroughly cleansed with ether. A control incision was made high up over the deltoid, and vaccination

was performed in the depression caused by the insertion of this muscle. With the point of the needle two small incisions about one-eighth inch in length and 1 inch apart were made through a drop of vaccine, as a rule not deep enough to draw blood. To one side of these incisions two punctures were also made about 1 inch apart. The vaccine was rubbed over these incisions and punctures with the shaft of the needle.

Examination.—All cases were examined within 48 hours for the purpose of reading the immediate reaction and within a week to read the positive reaction. In order to describe the degree of immediate reaction five arbitrary groups were made—four plus, three plus, two plus, one plus, and zero.

Four plus indicates the typical immediate reaction which is characterized by the formation of a distinct papule surrounded by a small area of hyperemia and often capped by a small amount of yellowish crustlike formation. The combined method of vaccination brought forth the distinctness of this reaction very forcibly. *Three plus*, *two plus*, and *one plus* represent gradations of the reaction. *Zero* indicates that no reaction was seen at the end of 48 hours as compared with the control incision.

Attention is invited to the fact that no attempts were made in this gradation to determine the degree of immunity present, but only to record facts observed—i. e., the degree of reaction present at the end of 48 hours.

The following tables represent the results obtained with the various lots of vaccine used:

TABLE 1.

(LOT 1.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	439	44	102	63	44	186	5	0
½ to 1 year	80	1	4	6	3	66	1	0
1 to 2 years	104	4	12	12	16	60	0	0
2 to 3 years	55	2	8	2	13	30	4	0
3 to 4 years	51	0	4	3	10	34	3	0
4 to 6 years	69	2	6	6	7	48	5	0
6 to 10 years	113	1	12	9	15	76	7	1
Over 10 years	92	0	7	11	4	70	9	0
No signs of successful vaccination (no visible evidence of scar)	62	24	12	9	4	13	6	22
History of smallpox	31	6	6	3	2	14	2	0
Total	1,096	84	173	124	118	597	42	23

This rather large series speaks quite well for the potency of this vaccine as indicated by the comparatively large number of positive reactions obtained, especially with regard to the group showing no signs of successful vaccination.

TABLE 2.

(LOT 2.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	131	11	23	21	4	72	1	0
½ to 1 year	63	1	2	1	2	57	1	0
1 to 2 years	39	0	3	3	1	32	0	0
2 to 3 years	29	0	2	1	1	25	0	0
3 to 4 years	19	0	1	2	0	16	0	0
4 to 6 years	30	0	6	2	0	22	0	0
6 to 10 years	30	0	1	5	0	24	0	0
Over 10 years	42	0	2	2	0	38	1	0
No signs of successful vaccination (no visible evidence of scar)	30	4	8	5	1	12	1	6
History of smallpox	11	1	2	2	1	5	1	0
Total	424	17	50	44	10	303	5	6

Lot No. 2 gave only an indifferent result with regard to potency as expressed by the rather small number of positive reactions.

TABLE 3.

(LOT 3.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	141	4	26	24	13	74	0	0
½ to 1 year	56	1	0	3	2	50	0	0
1 to 2 years	51	2	2	5	4	38	0	0
2 to 3 years	34	0	0	5	1	28	0	0
3 to 4 years	24	1	1	1	1	20	0	0
4 to 6 years	23	0	0	0	1	22	0	0
6 to 10 years	42	0	1	2	2	37	1	0
Over 10 years	57	0	2	7	2	46	0	0
No signs of successful vaccination (no visible evidence of scar)	23	1	7	2	2	11	0	1
History of smallpox	9	1	1	3	0	4	0	0
Total	460	10	40	52	28	330	1	1

Lot No. 3 has shown the least potency of all vaccines used with regard to the number of positive reactions obtained, both in total lot and in group, showing no signs of successful vaccination.

TABLE 4.

(LOT 4.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	97	0	4	0	0	93	1	0
½ to 1 year	153	0	0	0	0	153	15	0
1 to 2 years	66	0	0	0	0	66	6	0
2 to 3 years	40	0	0	0	0	40	4	0
3 to 4 years	29	0	1	0	0	28	5	0
4 to 6 years	19	0	0	1	0	18	2	0
6 to 10 years	62	0	0	0	0	62	5	0
Over 10 years	53	0	0	0	0	53	3	0
No signs of successful vaccination (no evidence of scar)	44	18	1	0	0	25	4	14
History of smallpox	6	0	0	0	0	6	0	0
Total	569	18	6	1	0	544	45	14

Lot 4 has proved to be one of the most potent vaccines used with regard to positive reactions obtained both in the total count and in group showing no signs of successful vaccination. Attention is also invited to the overwhelming number of 4+ immediate reactions in this table.

TABLE 5.

(LOT 5.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	151	15	44	20	11	61	0	0
½ to 1 year	72	4	4	3	3	58	2	0
1 to 2 years	58	1	4	5	6	42	1	0
2 to 3 years	46	1	5	3	3	34	0	0
3 to 4 years	29	2	2	3	2	20	0	0
4 to 6 years	35	0	2	3	1	29	1	0
6 to 10 years	85	1	3	3	12	66	0	0
Over 10 years	171	2	6	1	9	153	3	0
No signs of successful vaccination (no visible evidence of scar)	18	10	1	1	0	6	0	3
History of smallpox	15	5	2	3	0	5	0	0
Total	680	41	73	45	47	474	7	3

This lot has made a very poor showing, probably due to the effect of too high temperature in storage. It was kept in an ordinary ice box somewhat over a week before used.

TABLE 6.

(LOT 6.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	125	1	6	0	0	118	8	0
½ to 1 year	176	0	1	0	0	175	23	0
1 to 2 years	111	2	0	0	0	109	14	0
2 to 3 years	59	0	0	0	0	59	3	0
3 to 4 years	41	0	0	0	0	41	3	0
4 to 6 years	36	0	0	0	0	36	6	0
6 to 10 years	111	1	0	0	0	110	11	0
Over 10 years	91	1	0	0	0	90	6	0
No signs of successful vaccination (no visible evidence of scar)	48	19	4	0	0	25	1	13
History of smallpox	8	0	0	0	0	8	2	0
Total	806	24	11	0	0	771	77	13

Lot 6 compares favorably with lot 4 both as to positive reactions and number of pronounced immediate reactions.

TABLE 7.

(LOT 7.)

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	142	7	6	8	9	112	12	0
½ to 1 year	203	6	5	9	9	174	13	0
1 to 2 years	115	3	1	3	5	103	9	0
2 to 3 years	88	2	2	3	2	79	1	2
3 to 4 years	75	1	1	1	2	70	3	0
4 to 6 years	96	0	2	3	3	88	1	0
6 to 10 years	170	2	3	4	3	158	11	0
Over 10 years	246	3	4	6	3	230	18	0
No signs of successful vaccination (no visible evidence of scar)	50	24	0	6	0	20	3	18
History of smallpox	33	4	5	6	3	15	2	1
Total	1,218	52	29	49	39	1,049	73	21

This lot represents a potent vaccine, as shown by the number of positive reactions obtained. The marked potency of this vaccine has been in evidence during the entire series of vaccinations.

TABLE 8.

All lots and groups combined.

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.					Accelerated reaction.	Primary reaction.
		0	1+	2+	3+	4+		
½ year or less	1,226	82	211	136	81	716	27	0
½ to 1 year	803	13	16	22	19	733	55	0
1 to 2 years	544	12	22	28	32	450	30	0
2 to 3 years	351	5	17	14	20	295	12	2
3 to 4 years	268	4	10	10	15	229	14	0
4 to 6 years	308	2	16	15	12	263	15	0
6 to 10 years	613	5	20	23	32	533	35	1
Over 10 years	752	6	21	27	18	680	40	0
No signs of successful vaccination (no visible evidence of scar)	275	100	33	23	7	112	15	77
History of smallpox	113	17	16	17	6	57	7	1
Total	5,253	246	382	315	242	4,068	250	81

TABLE 9.

Composite table showing number and percentages of immediate reactions, degree of immediate reactions, and positive reactions after various periods since last successful vaccination.

Number of years since last successful vaccination.	Number vaccinated.	Immediate reaction.						Positive reaction.[1]	
		0	Per cent.	1+	Per cent.	2+, 3+, 4+	Per cent.	Number.	Per cent.
½ year or less	1,226	82	6.69	211	17.21	933	76.10	27	2.20
½ to 1 year	803	13	1.62	16	1.99	774	96.39	55	6.85
1 to 2 years	544	12	2.21	22	4.04	510	93.75	30	5.51
2 to 3 years	351	5	1.42	17	4.84	329	93.74	14	3.99
3 to 4 years	268	4	1.49	10	3.73	254	94.78	14	5.22
4 to 6 years	308	2	0.65	16	5.19	290	94.16	15	4.87
6 to 10 years	613	5	0.82	20	3.26	588	95.92	36	5.87
Over 10 years	752	6	0.80	21	2.79	725	96.41	40	5.32
No signs of successful vaccination (no visible evidence of scar)	275	100	36.36	33	12.00	142	51.64	92	33.45
History of smallpox	113	17	15.04	16	14.16	80	70.80	8	7.08
Total	5,253	246	.....	382	.....	4,625	.....	331	.....
Average percentage	.....	.....	4.68	.....	7.27	.....	88.05	.....	6.30

[1] Accelerated and primary reactions.

TABLE 10.

Comparison between number of positive reactions as to lots of vaccine used.

Lot No.	Total vaccinations in each lot.			Group—no signs of successful vaccination.		
	Number vaccinations.	Number positive.	Per cent positive.	Number vaccinations.	Number positive.	Per cent positive.
Lot 1	1,096	65	5.93	62	28	45.15
Lot 2	424	11	2.59	30	7	23.33
Lot 3	460	2	.43	23	1	4.35
Lot 4	569	59	10.37	44	18	40.91
Lot 5	680	10	1.47	18	3	16.66
Lot 6	806	90	11.16	48	14	29.16
Lot 7	1,218	94	7.72	50	21	42.00
Total	5,253	331	.....	275	92	.....
Average percentage	.....	.....	6.30	.....	.....	33.45

Discussion of tables.—Tables 1 to 8 represent the results obtained with the individual lots of vaccine. These results are brought together in Table 10, in which a comparison is made between the number of positive reactions as to lots of vaccine used, both in total vaccinations of each lot and in groups, showing no signs of successful vaccination. A few very interesting figures may be noted. With regard to the number of positive reactions in total vaccinations of each lot we find that lots 2, 3, and 5 gave a comparatively small number of positives, the proportion being nearly parallel in the groups showing no signs of previous successful vaccination.

When we realize that the different groups of men, for all practical purposes, present the same immunological characteristics, this difference in number of positive reactions must be caused by some inherent qualities in the various vaccines. Lots 2, 3, and 5 have been shown, in other words, to be of less potency than the other lots. In the composite Table 9 a few other interesting facts are demonstrated. The most apparent of these is that positive reactions are obtained in every group, no matter if the last successful vaccination occurred less than 6 months or over 10 years ago. The reasons for this occurrence lie undoubtedly in the peculiarity of the individual and in the virulence of vaccine used. This fact brings out the importance of revaccination in order to keep up the individual's resistance to smallpox. The reaction to cowpox vaccination is the only criterion we have as to the individual's resistance to smallpox, even though the resistance to this disease may be somewhat more marked than would be indicated by the results of revaccination.

Another striking peculiarity (Table 9) is the rather large number of no reactions in the first group, these men having had their last

successful vaccination within a half year. A point to bear in mind in this connection is the fact that these reactions were read at the end of 48 hours; some of the negative results may represent cases in which the reaction has already subsided. However, von Pirquet (2) has shown that a few cases immediately after primary vaccination (two–three weeks) will not show any reaction. The same thing holds true after smallpox. This condition will be taken up in more detail later.

The individuals comprising the group showing no sign of successful vaccinations represent men who have never had a positive reaction in spite of several attempts at vaccination. It seems that the explanation for the existence of such a group can be found in Table 10. Comparison between the results obtained from lot 1 and lot 3 shows the reason. Lot 1 represents potent vaccine, giving over 45 per cent of positive takes and lot 3 poor vaccine, giving less than 5 per cent of positive takes. Some of these individuals have, of course, some immunity to smallpox, shown by the fact that lot 1 in primary vaccination of recruits gives over 90 per cent positive reactions. But the important factor in this connection is that the majority of individuals have given some degree of immediate reaction, no matter what vaccine was used. Let us use the following facts as our premises:

(1) Various groups of men who, from their large number and identical condition in life must be considered to present the same immunological characteristics have been vaccinated.

(2) Various lots of vaccines, presenting various degrees of potency have been used.

(3) Potent vaccines and poor vaccines have given practically the same percentage of immediate reactions, varying slightly as to degree.

(4) Potent vaccines and poor vaccines have varied markedly as to the percentage of positive reactions.

Conclusions.—(1) Immediate reaction, as occurring subsequent to revaccination with poor virus is not a sure sign of protective immunity because if a potent vaccine had been used a positive reaction might have been obtained.

(2) Potent, living cowpox virus introduced into the dermal tissue of a nonimmune individual will produce vaccinia. The fact that no definite infection follows its introduction is prima facie evidence that immunity to cowpox exists.

(3) In order to get proper information with regard to the immunity of any individual toward cowpox (smallpox), it is of paramount importance that potent virus is used.[1]

[1] Potent virus should give 100 per cent positive reactions in nonimmune children.

COWPOX VIRUS.

What factors have bearing on the potency of vaccine virus? There are three factors that always must be taken into consideration when the potency of vaccine virus is discussed—the quality of seed virus, the purity, and the storage of the finished product. These three factors are all of importance—the quality of the seed virus must be high, i. e., it should be potent, the finished product should be comparatively free from contamination and should at all times be properly stored.

Seed virus.—The quality of the seed virus probably is the one factor that has the most marked influence on the results from which the potency of the vaccine is estimated. A poor, old, seed virus that has run through many generations of calves has no keeping qualities and loses its virulence for man very rapidly. Metchnikoff (3) in 1909 stated that it is necessary to regenerate virus that has definitely weakened in potency. This regeneration can be accomplished by passing the vaccine through another animal species, such as the rabbit (Calmette), the ass (Chaumier, Chalybaeus). But according to Metchnikoff it is better to acquire a new stock of natural cowpox. Morosoff (4) in 1913 told of the great difficulty experienced in the vaccine institute at Woronege to procure proper stock vaccine for inoculation of the calves because, as he expressed it, on the quality of the seed virus depended to a very large degree the success or failure of the vaccine. Morosoff finally developed a certain method of regeneration that he found to work very satisfactorily. After every three or four generations in calves the virus was run through rabbits, care being taken to use at all times the most virulent seed as determined by inoculating calves with diluted vaccine.

Chalybaeus (1919) (5) also used the rabbit for regeneration of the vaccine virus. He often takes the original stock from a smallpox case—the vaccine from the first inoculated calf never being used, however, for vaccination of man. He states that vaccine of this nature had at times been kept for years before being sent out. The vacine had also, in some cases, been kept at room temperature for weeks before used, with apparently no loss of virulence. This coincides with our experience that properly regenerated virus is not so susceptible to deterioration in room temperature as others. In order to show the excellent qualities of vaccine regenerated in the above manner, Chalybaeus reports that out of 25,218 primary vaccinations only 304, or 1.2 per cent, were without results.

Purity of finished product.—The statement of some manufacturers that the vaccine they put on the market is absolutely free from any

contamination is, of course, from the general nature of things not true. It is impossible to produce a vaccine that is not contaminated. To be sure it is contaminated with harmless, nonpathogenic bacteria. Proper precautions are taken to eliminate any chance of contamination with virulent pathogenic bacteria. Further, the large mass of bacteria present in the green virus is killed by the ripening process, by addition of glycerin, and by storage at a low temperature, the aim being to reduce contamination to the lowest point possible.

Federal control in this country insures the distribution of vaccine that can be considered absolutely safe in this regard.

The addition of glycerin (a method of preservation introduced in 1844) has proved to be a procedure of extreme importance for the proper keeping and distribution of the vaccine virus. It prevents any growth of bacteria and also has a distinct bactericidal property. The effect of the latter on the cowpox virus proper is nil if kept at low temperature.

Proper storage of the finished product.—In 1906 Blexall and Fremlin, of London, observed that vaccine kept cold conserves its virulence for a long time. Voigt (6) considers this observation to have as important a bearing on vaccination as the introduction of glycerinated virus. Numerous experiments have shown that vaccine kept at −5° C. will keep its virulence for an unlimited time. Voigt showed that glycerinated virus, exposed during three months to the action of *liquid* air, did not lose its virulence.

It is common knowledge to-day that vaccine virus should be kept in a cold place. The usual place of storage after it has left the manufacturer is in the ice box. The temperature of an ordinary ice box is between 50 and 60° F.—as a rule, nearer 60 than 50. Vaccine kept at such temperature will not keep its potency very long; deterioration may be noticed during the first week, especially when nonregenerated virus is being used. Cowpox vaccine should be kept near the freezing point. The proper place to keep this virus on board ship or at the training station is in the cold-storage room.

To overcome the untoward effect during actual shipment it seems that the scheme recommended by the United States Public Health Service should be ideal. They recommend the use of ice-cream freezers where the vaccine packages are kept in constant contact with ice.

RESULTS OF COWPOX VACCINATION.

Recent investigations have shown that smallpox and cowpox are identical in nature, the latter being the expression of the disease in animals. Smallpox of man can be transferred to animals, with the production of cowpox. The complement fixative properties of the two are identical.

PRIMARY VACCINATION.

The introduction of cowpox virus into a nonimmune man produces a disease known as vaccinia, or a primary reaction to cowpox virus. In the nonimmune individual this disease runs a definite course. There is an incubation period of three to four days, after which a little hyperemia begins to develop around the site of vaccination. In about seven more days the disease has reached its height, with the complete development of pustules, surrounded by a more or less marked intensive area of inflammation. This is later followed by crust formation and healing, which leaves the typical scar of vaccination. This course is rather definite in the nonimmune.

REVACCINATION.

Vaccination of individuals who show signs of previous successful vaccination or who have had smallpox presents a different picture, at least as to degree.

Vaccination was introduced because experience had taught mankind that by this procedure protection was acquired against smallpox. The duration of this protection has not been definitely settled. As a rule, however, it lasts for a number of years. The reaction of these individuals to revaccination occurs rather early and is characterized by a mild inflammatory reaction around the site of vaccination—the immediate reaction, so called.

The individual who has lost his immunity to a marked extent responds in a still different manner. The reaction resembles very much that of primary reaction, differing, however, in that it appears sooner and subsides quicker. The pustule reaches the height of its development on the fifth to the seventh day, with subsequent crust formation and healing, leaving the typical scar of vaccination—the accelerated reaction.

HYPERSENSITIVENESS.

In order to attempt to bring out the underlying factors that have served to explain the cutaneous reactions, indulgence is asked for the following discussion.

In the literature one finds a certain amount of confusion in attempts to explain the significance of and underlying cause for these reactions. They are variously described as hypersensitive, anaphylactic, and allergic phenomena.

In recent literature there is to be found, however, a distinct tendency to bring order out of the chaos which exists regarding our conception of these conditions—hypersensitiveness, anaphylaxis, and allergy.

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Coca (7) defines hypersensitveness as a condition of specific or particular reactivity, with characteristic symptoms, to the administration of or contact with any substance in a quantity which to most of the individuals of the same species is innocuous. He adds the following restrictive explanations:

(1) The "characteristic symptoms" are generally different in the different animal species for the same group of substances.

(2) They are uniform in any one species for various substances.

(3) Where the exciting agent possesses a normal physiological action, for example the drugs, the symptoms of this action are, with few exceptions, different from those of hypersensitiveness to that agent.

Under the heading "hypersensitiveness," Coca includes two groups of phenomena, "anaphylaxis and allergy." The definition given hypersensitiveness is broad enough to include these two conditions; in all other respects the two are diametrically dissimilar.

"(1) The exciting agent in anaphylaxis is always an antigenic substance; that in allergy is often nonantigenic and can not, therefore, induce a condition of anaphylaxis.

"(2) The existing agent in anaphylaxis is always induced by previous introduction of an undigested substance within the body of an experimental animal. Such a procedure has not been shown to induce *allergic hypersensitiveness* in human beings, and the weight of evidence is overwhelmingly against such an assumption. Allergy is often exhibited immediately upon the first contact with the exciting agent.

"(3) The hypersensitiveness of anaphylaxis is not a heritable condition. That of allergy has been proven to be inherited, and when the mother is affected the hypersensitiveness of the offspring seems to be more often exhibited to a different substance than the one that affects the mother. (Cooke and Van der Veer.)

"(4) The phenomenon of desensitization, which never fails in anaphylaxis, is entirely wanting in allergy. It is true that a certain degree of lessened sensitiveness to natural contact with the existing agent is often attained in allergy, which may be termed *clinical insensitiveness.* In all such cases, however, the suitable administration of the exciting agent, by intracutaneous or subcutaneous injection, will demonstrate the persistence of the hypersensitiveness (Cooke)."

Coca excludes by the terms of the foregoing definitions the tuberculin reactions of Koch and the so-called toxin hypersensitiveness from the category of true hypersensitiveness; because,

"(1) The symptoms of tuberculin reaction are the same in all animal species.

"(2) The symptoms of toxin hypersensitiveness is not different from those of the normal physiological effect of the agent."

He further states that the weight of evidence is overwhelmingly against the assumption that allergic hypersensitiveness in human beings can be induced by a previous introduction of an undigested antigenic substance.

In accordance with this reasoning another explanation than that of allergic hypersensitiveness has to be given for the reaction occurring so often in revaccination against smallpox.

Wells (8) does not agree with Coca in placing anaphylaxis and allergy diametrically opposed to each other. He considers the term allergy broad enough to cover all the manifestations of altered reactivity and to indicate their relationship to one particular form of allergy—anaphylaxis. Wells gives seven criteria to which all phenomena of anaphylaxis must comply, including all of Coca's criteria except the one in which Coca states that the symptoms of hypersensitiveness should be different from the normal physiological action of the exciting agent. He adds a few more criteria, drawn from the more recent work in this field.

In contrast to Coca's opinions regarding the cutaneous reaction, Wells points out the conclusion of Kolmer (9) that there are true anaphylactic skin reactions, "due to the interaction of a specific anaphylactic antibody and specific anaphylactogen largely within or without the cells, and with the formation of a diffusible irritant capable of producing acute hyperemia, edema, and leucocytic infiltration of the skin."

Karsner and Ecker (10) use the term hypersusceptibility and divide it into two groups, natural and acquired. They prefer not to employ the term allergy, which, according to their opinion, leads to confusion.

"The individuals in whom hypersusceptibility is supposed to be natural have undoubtedly acquired the state by preliminary inoculation of the substance to which they are susceptible. This may be an unconscious, forgotten, or concealed acquisition." "Acquired hypersusceptibility is mainly exhibited in anaphylaxis."

For all practical purposes natural hypersusceptibility of Karsner and Ecker corresponds to Coca's conception of allergy, although the former do not express the same decided views on the subject as the latter.

Karsner and Ecker place the cutaneous reactions in the group of acquired hypersusceptibility and explain their appearance according to the theories offered for anaphylactic shock.

In this connection it might be well to discuss in a little more detail the cellular theory of anaphylaxis.

It has been stated that contrasted with our wealth of knowledge covering immune sera one is struck with the poverty of immunological data concerning the fixed tissues. Recent investigations undoubtedly tend to prove that the fixed tissues play a distinct rôle in immunological phenomena.

The relation of fixed tissue cells to anaphylaxis.—Numerous theories have been advanced as to the underlying factors influencing the occurrence of such phenomena as anaphylaxis. Recent experiments seem to show, however, that the fixed tissue cells have a distinct bearing on this phenomenon.

The work of Schultz, Dale, Woods (10), Manwaring, and his coworkers (11) undoubtedly goes to prove that the fixed tissue has acquired a certain property necessary for the occurrence of this phenomenon.

The correctness of this theory is further emphasized by the fact that a certain interval of time must elapse before an animal becomes passively anaphylactic, an interval in which it is presumed the cells either anchor or develop the sensitizing substance. Otto and other investigators have shown that the serum of a hypersusceptible animal, when injected into a normal animal, will render the latter also hypersusceptible, but not until at least four hours have elapsed after the intravenous injection.

According to Coca (7) this proves that the manifestations of anaphylaxis are due to an antibody—antigen reaction. The condition undoubtedly is transferred in the serum, but due to the interval of time required the above experiment also seems to show that the fixed tissue cells have to be acted upon before the reaction can take place.

Friedberger (10) believed (before he advanced his anaphylatoxin theory) that the primary injection leads to the development of receptors in the cells, but in such small amounts as not to be liberated into the blood stream. These "sessile" receptors are responsible for an increased affinity of the cells for the antigen, the consequent disturbances resulting from the rapid anchoring of the protein by the cells. If injections are repeated before the anaphylactic state is developed, receptors are formed in large amounts and appear in the blood stream as precipitins.

Karsner and Ecker believe this theory accords well with the modern conception of immunity and anaphylaxis save for the assumption that the sensitizing substance and precipitin are identical.

Weil (10) considered that the cells are of the utmost importance in the destruction and elimination of foreign protein and that in the course of this process they construct an antibody. The union of antigen and antibody within the cells gives rise to the serious disturbances which constitute anaphylaxis.

Skin reactions in general.—If we consider that skin reactions are true manifestations of hypersensitiveness, their occurrence can easily be explained by any one of the theories offered for anaphylactic shock. If the sensitizing substance is within the cells the local contact of the antigen in the tissues of the skin explains the reaction. Coca's hereditary theory of allergy of course offers no explanation for the underlying causation. His exclusion of the various skin reactions from any relation with hypersensitiveness, for reasons previously cited, the writer believes is a step in the right direction.

The various investigations made in different infectious diseases have brought forth the fact that these reactions when obtained, or not obtained, do not give any definite information as to the immunological condition of the individual in question.

Von Pirquet placed the tuberculin reaction in the domain of hypersensitiveness, but further studies by Krause (12) showed that guinea pigs could be sensitized to tuberculoprotein so that they gave typical anaphylactic reaction, without, however, giving the skin reaction to tuberculoprotein. The skin reaction could not be obtained except by producing an actual tuberculous infection somewhere in the animal.

Fleischner, Meyer, and Shaw (13) injected guinea pigs with dead bacilli or bacterial proteins (B. tuberculosis, B. abortus bovinus, B. melitensis) and found that the agglutinin content of the blood became high, but that no cutaneous sensitivity was produced; guinea pigs, however, infected with living bacteria gave positive tests.

These investigations go to show that there is something else besides sensitization to a foreign protein that takes place when an infection with a living organism is present.

Kolmer (9, 14) concluded after studying the sera of persons reacting positively and negatively to the typhoidin, luetin, and diphtherin tests that there is no experimental support for the theory that "allergic" skin reactions may be taken as index to resistance and immunity in as far as it is possible to determine the presence of antibodies in vitro.

Kilgore (10) studied the typhoidin test clinically and found that it is unreliable.

Attention is here invited to the fact that in revaccination against smallpox potent living virus is used.

IMMEDIATE REACTION IN REVACCINATION WITH COWPOX VIRUS.

Jenner noted that in certain individuals who had previously been vaccinated against smallpox a second vaccination might produce a local reaction which did not go on to produce vaccinia.

Von Pirquet (12) studied these phenomena very extensively, and it is largely through his work that the interest in this reaction was reawakened. He goes into the subject thoroughly and describes the reaction very minutely. "Three to six hours after the vaccination a new area of hyperemia appears (in contradistinction to the traumatic reaction). The reaction is at first macular, but within a few hours becomes distinctly palpable (4–9 hours after vaccination). The central papule reaches its maximum of development in about 36 hours. At this time it is about 4 to 5 millimeters broad, brownish-red in color, and is covered by a yellowish crust. It now begins to disappear. During the course of the following week the elevation has disappeared entirely, but often a slight pigmentation will remain for months."

Von Pirquet finds that by using human lymph (vaccine), fresh and undiluted, the early reaction differs somewhat from the reaction produced when cowpox vaccine is used, but only in intensity. The reaction begins earlier (within two hours after vaccination), lasts longer, and a small vesicle is formed, surrounded by a large area of intensive hyperemia. The contents of this vesicle is always clear; pustule formation never occurs.

Form the above findings, Von Pirquet concludes that the intensity of the early reaction depends upon the quantity of virus used, as expressed by the difference between the undiluted human vaccine and the cowpox vaccine mixed with glycerin. Von Pirquet never saw any negative reaction except in cases of revaccination during the first month after primary vaccination, and then only in a few cases.

Von Pirquet does not agree with Pfeiffer and Wolf-Eisner in that the entire reaction can be explained by the action of the bacteriolytic antibodies liberating the toxin; the more germs are acted upon, the more endotoxin is set free and the larger and more intensive must the zone of reaction be. But, as Von Pirquet states, if we only are to consider the bacteriolytic action, the reaction must also be dependent on the amount of antibodies present. If the same amount of virus is used, the person who has the largest amount of antibodies in the skin should show the stronger reaction. Hence one would expect the most intensive reaction just after the primary vaccination; but we find only about half of these cases give any immediate reaction.

Von Pirquet advances a new hypothesis. He explains the various phenomena by the existence of two kinds of antibodies—one against the capsule (lytic in character) and one against the contents (antitoxic in character). When both are present in large numbers, as just after the primary vaccination, the capsule is rapidly dissolved

and the poisonous content neutralized by the antitoxin (probably helped by leucocytes). No reaction will then occur. The antitoxic antibody disappears faster than the lytic antibody; hence by virtue of the relatively small amount of antitoxic antibodies present the immediate reaction is produced at subsequent vaccinations, apparently due to the irritant action of the "endotoxin." During revaccinations the formation of the capsular antibodies is always in advance of the antitoxin so that the absence of reaction will never occur again; this reaction is further accentuated by the state of hypersensitiveness developed by repeated vaccinations.

Gins (15) apparently agrees with Von Pirquet in the latter's explanation of this phenomenon.

With the appearance of the complement-fixation tests, numerous investigators applied this test to smallpox and cowpox (notably Jobling, in 1906). Further investigations have shown that this test is positive in a large per cent of persons recently recovered from smallpox and vaccinia. Gastinell (16) approaches the problem from a somewhat different angle. He gives two distinct properties to the serum, acquired through the act of vaccination—the neutralizing power of the serum, i. e., the faculty to neutralize fresh virus by simple mixture and thus render it avirulent, and the fixative power of the complement as shown by the positive complement fixation tests.

Gastinell states that the complement fixation phenomenon occurs before the establishment of the antivirulent property and like other investigators finds it limited in duration. The immediate reaction can only be produced through revaccination of an individual in whom the "sensibilisatrice" that fixes the complement has disappeared and the "neutralizing" property of the serum has been formed. It is the latter that seems to characterize "in vitro" the antibody which causes the state of allergy.

Force (17) has made some exhaustive studies on this subject and concludes that "if antibodies against virus are present in the blood of the individual the immediate reaction occurs, characterized by the formation of an areola around the vaccinated spot, usually within the 24 hours succeeding the vaccinations.

"If antibodies are not present, but the power of forming them exists through previous vaccinations, the growing vesicle is aborted sooner than in a previously revaccinated person, which accounts for the small size of the vesicle and the early appearance of an areola, larger than in the case of a vesicle of the same age."

Karsner and Ecker state that there apparently occurs, following smallpox and vaccinia, an altered state which determines these local reactions, but the interpretations offered by Force that some of these reactions are immune reactions still lacks satisfactory confirmation and is not consistent with other studies of cutaneous reactions.

Force (18) has recently stated that he was formerly of the opinion that inert vaccine might give immediate reactions in immune subjects, but is now convinced that this is unusuaal and that failure to produce some reaction is evidence of lack of potency.

Let us present here a hypothetical table showing what might happen at time of revaccination to 16 individuals that have been vaccinated at the same time in childhood and present the same immunological characteristics.

TABLE 11.

Sixteen individuals having been vaccinated at the same time in childhood and presenting the same immunological characteristics.

No.	Time elapsed since primary vaccination.	Reaction.
1	2 weeks.	None.
2	1 month.	1+immediate reaction.
3	1½ months.	2+immediate reaction.
4	2 months.	3+immediate reaction.
5	3 months.	4+immediate reaction.
6	1 year.	Do.
7	2 years.	Do.
8	3 years.	Do.
9	4 years.	Do.
10	5 years.	Do.
11	6 years.	60 hours; immediate reaction.
12	7 years.	72 hours; immediate reaction.
13	7½ years.	96 hours pustule.
14	8 years.	5 days pustule.
15	9 years.	6 days pustule.
16	10 years.	7 days pustule.

It has been shown that a certain number of individuals revaccinated a few weeks after their primary vaccination presented no reaction at all when examined within 48 hours. Others showed only a slight hyperemia (1 +). This degree of reaction is also most common amongst those who have been vaccinated recently. Hence it seems that the results of revaccinations as outlined in Table 11 represent what actually would occur under conditions stated. In this connection attention is also invited to cases giving a history of smallpox in Tables 1 to 9. Note the comparatively large percentage giving no reactions or very mild reactions (1 +). It may be of interest to note that from the appearance of these reactions it was often possible to determine if the individual had been recently vaccinated (as shown by the presence of a purple scar) or if he had had smallpox (as shown by presence of pocks or history).

In the entire series there was only one man who was absolutely refractory. He gave no reaction whatsoever, in spite of the fact that he had never been successfully vaccinated. or never had had smallpox. He was in all probability a case of marked natural immunity.

It seems safe to assume that the immunity toward smallpox (and cowpox) is most marked immediately after vaccination and for a variable period after an attack of actual smallpox. This condition is expressed by the absence of reaction toward the cowpox virus just after the disease (vaccinia or smallpox); the subsequent changes in immunity are expressed by the intensity of the reactions or rather by the time of their subsidence. It has been shown that the reactions gradually increase in intensity with the time elapsed from the primary vaccination.

Force, as above quoted, states that in vaccinoid (accelerated reaction) we have a condition in which there are no antibodies present, but that these are rapidly forming because of a previous vaccination. Now the questions present themselves: Where is the line of demarcation between the immediate reactions and the accelerated reaction? Is there such a marked difference between these two reactions as one would be led to believe from the statements of various authors? If so, there must be a period when the former ceases to exist as an immediate reaction and the inflammatory changes, seen during the first 48 hours, cease to be the expression of such a reaction and begin to be part and parcel of the accelerated reaction. (Reactions typical of the immediate are seen within 48 hours in cases that develop the accelerated reaction.)

From our series of revaccinations one would be led to believe that such a line of demarcation does not exist. The transition from the immediate reaction to the accelerated reaction is a gradual one.

If these reactions are entirely different as to causation—one, the expression of hypersensitiveness, allergy, or anaphylaxis, and the other a true infection—when does the agent causing the immediate reaction cease to act, and when does the agent causing the positive reaction (infection as demonstrated by the pustule formation) begin to act?

Force's experience that inert virus rarely produces the immediate reaction strongly supports our opinion that the skin reaction in revaccination (with potent virus) is the result of something different than the reactions obtained in the experiments on animals with foreign proteins—hence have no bearing on reactions of hypersensitiveness, be they allergic or anaphylactic in character. The reactions in revaccination, immediate or accelerated, have one exciting agent—the potent virus. There are, to be sure, certain predisposing factors on the part of the individual that determine the degree of reaction;

these predisposing factors consist of the immunological state of the individual in question and determine the rapidity of subsidence of the reaction.

Gins (15) in discussing revaccination states in part: "We find in the revaccinated persons all transitions between the true immediate reaction and the positive take. The expression 'transition' is not good when the immediate reaction and the positive take are fundamentally different phenomena.

"From the standpoint of the vaccinator who reinspects the cases on the seventh day after vaccination, the following are the most important forms of reaction found in the revaccinated person.

"(1) The line of incision is hardly visible—no reaction.

"(2) The line of incision has a small nodule.

"(3) In the line of incision there is a small vesicle with or without areola, that has already passed its height of development.

"(4) In the line of incision there is a pustule with areola still present, that has not yet reached its height.

"Two to four are positive cases."

Gins further states that the small nodular reaction stands very near to the immediate reaction and represents a quite strong immunity. "With regard to the vesicular and pustular reaction the situation is quite different. A hypersensitiveness reaction of marked severity may be present or also the least degree of an increase of the vaccine virus at the site of vaccination. The difference can only be determined by demonstrating the presence of vaccine virus through the rabbit's eye. A fully developed pustule occurs only when the immunity is lost. It seems that a complete loss very seldom occurs as the pustule in revaccination as a rule is fully developed in 7 to 10 days."

The true pustule undoubtedly causes a new development of the vaccine immunity. Hence the characteristic of the immunizing pustule is "marked increase of virus at the site of vaccination."

"We have now to differentiate between two groups of results after revaccination:

"(1) The true 'immediate reaction,' the nodule and the vesicle without increase of virus as pure immunity reactions.

"(2) The more or less pronounced pustule with increase of virus as an expression of a new or renewed immunization."

We see here an attempt to answer the questions asked above. Gins brings in the procreation of the virus at the site of vaccination as the determining factor. Undoubtedly this is good reasoning, but the question arises if the rabbit's eye can be considered as the absolute criterion of the presence of living virus. Gins states that the small nodular reaction stands very near to the immediate reaction and

represents quite a strong immunity. From this statement it may be assumed that this author believes that the immunity is not quite as strong as when expressed by the immediate reaction. In other words, the more the reaction resembles that of a positive take the less immunity is present. The time when it is biologically possible to demonstrate the actual increase of virus indicates beyond the question of a doubt that the individual is at least partly susceptible to the disease and is at this time, by the nature of the infection, increasing his immunity toward the disease.

It seems to the writer that the stage present when the increase of virus is demonstrable through the rabbit's eye represents a quite appreciable increase of virus in situ. It seems reasonable to suppose that reproduction has taken place for some time before being detectable through this manner.

When we consider the actual procedure of vaccination—that is, introducing a living germ into what under ordinary circumstances is an excellent medium for its growth, the derma, and the time it takes before the reaction has reached its acme—12 to 72 hours—it seems reasonable to assume (knowing that inert virus will not give the reaction) that the virus is alive for a certain period of time and perhaps growing. This period depends on the rapidity of subsidence of the reaction. The more rapid the subsidence the shorter the life of the germ. The reaction depends on two factors—the potency of the virus and the immunity of the individual. A partially immune person may have enough immunity to overcome the action of a poor virus within a comparatively short time, thus giving the immediate reaction; whereas if a more potent virus were used for accelerated reaction would be the result—i. e., the germs in the latter case would have enough virulence to increase in numbers to such an extent as to be appreciated by the rabbit's eye before the protective forces of the individual could overcome the infection.

Force states that the accelerated reaction indicates a complete loss of immunity and a rapid formation of such on account of previous vaccination. The consensus of opinion, however, is that a complete loss of immunity is not required before an accelerated reaction takes place.

It is easily understood why the accelerated reaction subsides sooner than the primary reactions, it being undoubtedly due to the rapid formation of large amounts of immune bodies, which cut the disease short. But what causes the earlier appearance of the accelerated reaction? A mature vesicle may be found on the fifth or sixth day, if not earlier. Hypersensitiveness might explain it, if by that term we mean that these individuals are more sensitive to the virus than nonvaccinated individuals. This seems to the writer to be the real underlying factor of the reactions observed in revaccinations.

Vaccinia produces a certain condition in the body, rendering a more rapid action of the virus possible, which is, however, coupled with and counteracted by the production of immunity.

When the individual (see Table 11) who is revaccinated within three weeks after his primary vaccination shows no reaction within 12 to 48 hours, it means that the reaction probably occurred during the traumatic stage and hence was not noticed, due to its sudden subsidence—i. e., the immunity present was marked enough to kill the invader within a very few hours.

The individual vaccinated within six months after primary vaccination may show an immediate reaction that reaches its acme within 24 hours and then begins to subside. The individual vaccinated within one year after his primary vaccination may also show a reaction that reaches its acme within 48 hours. The individual vaccinated within seven years may show an immediate reaction that reaches its acme within 72 hours before subsiding, and the individual vaccinated within eight years may show the formation of a pustule that reaches the maximum of its development within five days. In line with this argument every vaccination that is followed by a reaction—primary, accelerated, or immediate—increases the immunity of the individual (16, 19).

The results obtained as shown in Table 9 seem to the writer absolute proof of this assertion. The percentage of positive takes is practically the same in all the groups showing signs of previous successful vaccinations, no matter if this occurred one year or ten years ago. The men comprising these groups have been vaccinated at least every four years, the majority probably on an average of every two to three years. The resistance to the disease has been kept up by repeated vaccinations in spite of the fact that no positive reactions were obtained.

SUMMARY AND CONCLUSIONS.

1. Over 5,000 revaccinations were performed at Great Lakes United States Naval Training Station with various lots of vaccine.

2. The vaccines varied in potency as expressed by the number of positive takes but not as shown by the number of immediate reactions.

3. Cowpox vaccine should at all times be kept near 0° C. The best place for storing it is in the cold-storage room.

4. "Regeneration" of cowpox virus has a distinct bearing on its potency for man.

5. The value of the immediate reaction is absolutely dependent on the known potency of virus used.

6. The failure to produce the typical pustule when introducing potent virus into the skin is prima facie evidence that immunity to smallpox exists.

7. Vaccinia and smallpox produce a certain condition in the individual whereby the virus at a subsequent introduction is rendered more rapid in its action. This condition is coupled with and counteracted by the production of immunity.

8. The state of immunity can be determined by the time of subsidence of the reaction in case of revaccination with potent virus.

9. Revaccinations increase the immunity of the individual even if the pustule is not formed.

REFERENCES.

(1) Notes on Preventive Medicine for Medical Officers, United States Navy, Washington, D. C. Bulletin No. 110, Sept. 15, 1921.
(2) Von Pirquet, Klinische Studien über Vakzination and vakzinale Allergie, Leipzig u. wien, 1907, F. Deuticke.
(3) Metchnikoff. Vaccination antivariolique, Mediament microbiens. E. Sacquépé. 1909.
(4) Morosoff, M. Revue internationale de la Vaccine, 1913. Vol. 4, p. 51.
(5) Chalybaeus, Hyg. Rundschau, Berlin, 1919, Vol. XXIX, p. 377.
(6) Voight, L. Revue internationale de la Vaccine, 1913, Vol. 4.
(7) Coca, A. T. Jour. Immunology, 1920, Vol. 5, p. 363.
(8) Wells, H. G. Physiological Reviews, 1921, Vol. 1, p. 44.
(9) Kolmer, J. A. Johns Hopkins Hospital Bulletin, 1917, Vol. 28, p. 163.
(10) Karsner and Ecker. Principles of Immunology, 1921.
(11) Manwaring, W. H. Meinhard, A. R., Kusama, Y. New York. Med. Jour., 1917, Vol. 106, p. 384.
(12) Krause, A. K. American Review of Tuberculosis, 1917, Vol. 1, p. 65.
(13) Fleischner, Meyer and Shaw, Am. Jour. Dis. Child. 1919, Vol. XVIII, p. 577.
(14) Kolmer, J. A. Jour. Immunology, 1916, Vol. 1, p. 473.
(15) Gins, Hyg. Rundschau, Berlin, 1919. Vol. XXIX, p. 384.
(16) Gastinell, P. Bull. Medic., Paris, 1920, Vol. XXXIV, p. 219.
(17) Force, J. W. J. A. M. A. 1914, Vol. LXII, p. 1466.
(18) Force, J. W. Personal communication to Surgeon General, U. S. N.
(19) Paschen, Deutche med. Wchnschr. Leipzig u. Berlin, 1920, Vol. XLVI, p. 1359.

SOME ELEMENTS OF LEADERSHIP.[1]

By E. L. Munson, Colonel, Medical Corps, United States Army.

PART II.

Duty.—The sense of duty recognizes ideals and implies the acceptance of obligations dependent upon them. It is largely the result of artificial culture and in its nature and extent depends upon the code accepted as the standard. An appreciation of duty is the basis of trustworthiness and dependability. Without it, the soldier will place personal interests first and fail in a crisis affecting his

[1] Reprinted from "The Management of Men," by permission of Henry Holt & Co., New York City, and the author, Edward L. Munson, Colonel, General Staff (Medical Corps), Chief, Morale Branch, War Plans Division (lately Brigadier General, General Staff).

command. Duty is at the basis of social organization and human interrelations.

The performance of duty should be brought to the attention of the men in such tactful way that they unconsciously come to regard it as a privilege rather than a matter of compulsion. Through the instincts of constructiveness and self-assertion, duty, well done, should bring the glow of satisfaction.

There are certain duties the very nature of which causes them to be unpleasant. But these unpleasant effects can be eliminated or neutralized by appropriate states of mind, whereby the unpleasant reaction is submerged under wholesome ones, often artificially created. Any duty that is necessary, however humble or disagreeable, is ennobled by that fact. But duties should be rotated as far as possible, lest there be suspicion of partiality. To make punishment of a duty is to pervert purpose and degrade duty. The relation of this to kitchen police as punishment is well worth considering. The restriction of privilege serves equally good disciplinary purpose.

As in industrial work, it is frequently possible to so conduct duties that the personal comfort of the men and the resulting efficiency are both promoted. In many instances there is no reason why this should not be done. That it is not done habitually is often due to the traditional and erroneous idea that the duty of the soldier should be hard and uncompromising, even if this be unnecessary, lest he be softened by so-called coddling. Commanders should reflect that the American soldier is intelligent enough to both discern and resent the imposition of needless discomfort, whether it be due to ignorance, neglect, or poor leadership. The same quality of intelligent discernment also makes him cheerfully undergo equal or worse discomforts when he realizes that they are unavoidable. In the promotion of morale, an orderly routine makes for contentment. Duties should be so classified as to have an appropriate time for everything.

Because the sense of duty implies the acceptance of obligations is no reason why it should be so overburdened and overworked as ultimately to render everything obnoxious and abhorrent which comes within the most broad conception of it. Any claim that all things unpleasant and laborious must be done just because obligation requires it merely destroys the high ideals and fine conception of duty. Therein lies a grave danger, for by persistent pursuance of such a plan men may eventually detest the very mention of the word and everything connected with it. It will become a taskmaster instead of an ideal or a standard to be achieved. If a task is laborious or unpleasant it is far better to give a man some real incentive for doing it than to drive him to it under a perverted sense of duty.

Patriotism.—The earliest conception of patriotism consisted of a passion to destroy a rival tribe. Alexander the Great, to make his Empire glorious, determined to bring under tribute every tribe and nation under the sun. Rome pursued the same policy in her ruthless destruction of Carthage. Even the ancient Hebrews were not immune from the toxin of a barbarous idea of conquest. The German menace, with its "Deutschland über alles," represented the old-school patriotism—direct in its descent from the dreams of conquest and world dominion of Assyria and Babylon, and, in its attitude toward some other nations, very much like the Roman attitude toward Carthage.

Under the old idea, patriotism consisted in doing one's utmost to bring power, honor, and glory to one's own nation, even, if expedient and necessary, at the expense of other nations. The American conception of patriotism is of a higher order—to bring power, honor, and glory to the United States through honest effort, through good government, through unselfishness and not conquest, through friendship toward the other nations of the earth and especially the weaker, through making the name and flag of the United States honored and respected among all nations—and all this not alone for its own sake, but for the benefit of humanity and the race. Such a conception does not belittle patriotism, it ennobles it. Neither a man nor a nation can exist worthily for his own or its own sake alone. Both have a part and a duty toward others in lifting civilization to a higher plane and in contributing permanent values to the life of the civilized world. This is the true conception of patriotism—and nationalism.

Patriotism is the esprit de corps of a people—the merging of individual minds into a national, communal mind. To this is added the factor of tradition, an intangible yet vital force, which idealizes effort and stimulates and unifies action. The traditions of American patriotism are the traditions of free men—right, justice, liberty, supreme national honor, and the inalienable privilege of a people to govern themselves. There is no black-letter lore in the traditions of the United States, no ulterior motives of conquest and selfish dominion, for they sprang from the principles of religious and civil liberty which still guide and determine the development of its destiny.

All interests—family, class, party and the material good of the individual—take their places in the scale of values below the ideal of patriotism. It is the neutral ground of class differences and should be an arbitration factor in all disputes between capital and labor. It should be an active quality in citizen and soldier, in capitalist and worker. Even as "Civis Romanus" was the title of honor in the days of the Roman Empire, so even more significant to-day should be the title, Civis Americanus—an American citizen.

The patriotism of the Romans was not typified by the geographical conception of a Mediterranean peninsula, nor that of the Greeks by an Adriatic archipelago. The Roman patriotism was love of the Empire, its excellence, the superiority of its arms, the glory of its statesmen, the superb beauty of its art, its conquests. That of Greece was founded on nobility, physical and mental; on courage; on the love of the beautiful and the true; on freedom from oppression and domination. And so, neither is American patriotism a mere conception of a geographical area called the United States. It is all that was best of the Greek and Roman patriotism, the spirit of the Magna Charta, the courage of Bunker Hill, New Orleans, Chapultepec, Gettysburg, Santiago, and the Argonne.

Patriotism may be the medium of expression of several of the basic instincts—the creative, the self-assertive, the religious, and the gregarious. It is closely akin to the family sentiment, for through the nation comes protection for the home and family. In a child it may be blind devotion, but in the man it should be an intelligent love. His country's honor should be as dear to him as his own. It is the spirit of Scott's immortal lines:

> "Breathes there a man with soul so dead,
> Who never to himself hath said,
> This is my own—my native land!"

Patriotism varies greatly in different countries and with different peoples. As we understand the term, patriotism is not high among certain peoples, who do not realize a national community of interests as some other nations do. In addition to tradition there enters into patriotism love of physical environment, mountains, rivers, and scenery; common language, and hence community of modes of expressing thought; common customs, including diet, clothing, and other expressions of habit; common history; a common form of government; common industries and other economic interests. Inasmuch as all of these factors are different the conception of patriotism varies with the nation. One can not understand that of another. Similarly the patriotism of any two persons in the same country is a variable.

In our country, with its heterogeneous population, a considerable part of which is foreign born, the problem of patriotism is a great one and is largely linked up with the one of Americanization. An individual must have a sympathetic understanding of the ideals of his country and a personal interest in its welfare in order willingly to encounter perils in its behalf. The immigrant of transient purpose of residence, whose life in this country is led with the viewpoint of an outsider, can scarcely be expected to be acutely interested in its defense. In inculcating patriotism soldiers should be taught to

regard themselves as selected men, charged by the United States as its direct representatives with the defense of the ideals of its government.

Esprit de corps.—Esprit de corps is a mental state which represents the resultant of all forces making for cohesion of an organization. It is as necessary to commercial success as it is to military efficiency. It is the sense of strength and pride which comes from feeling oneself a part of a distinguished and efficient organization of splendid traditions engaged in a noble work, each member of which is giving the best that is in him to the common end.

Esprit de corps is a quality developed by the commander and transmitted through subordinates until it pervades the mass. Practical psychologists recognize the influence of contagion as of first importance in creating "a common mind to a common end." Unusually alert, cheerful, and enthusiastic officers and soldiers should be made to feel their special value and responsibility in communicating their spirit to the unit and beyond it to the Army as a whole. They should be made to understand that the degree of esprit de corps is largely in their hands.

In sublimation, esprit de corps is a valuable agent. This relates to the accepted obligation of the individual to preserve the honor and welfare of his organization, and to the promotion of a comradeship which is even more effective against fear and bad conduct than the abstract sentiments of honor and duty. Esprit de corps in peace is usually based on long service; in war, on intensive service. Battles weld organizations together like nothing else.

Organizations vary greatly in their degree of esprit. Where it is low the commander has failed in one of the main attributes of leadership. Esprit expresses itself in efficiency.

The sentimental bonds of comradeship, though light as air, are strong as steel in holding men together for common purpose. The promotion of comradeship in every possible way should therefore be one of the first interests of superiors. It begins with the close "buddy" relationship between individuals and extends through the larger group beyond the limits of direct acquaintance. Mutual knowledge and relations between individuals and units within the same greater group, promoted in the various ways, are very valuable in bringing this about. The intimacy within a unit by the men calling each other by their first names assists in comradeship and good feeling. Reciprocal good feeling for large units and the service as a whole should be encouraged. Similarly, it should be developed between allies.

A measure to this end was taken by King George when he caused an autographed letter to be sent to every American soldier sent to

England for training. The envelope was addressed, "A message to you from His Majesty King George V." The letter read: "Soldiers of the United States, the people of the British Isles welcome you on your way to take your stand beside the armies of many nations now fighting in the Old World the great battle for human freedom. The Allies will gain new heart and spirit in your company. I wish that I could shake the hand of each one of you and bid you Godspeed on your mission."

Where there is lack of community of interest, there will be a tendency not to give the utmost and perhaps to "loaf on the job." The highest type of morale is found where each man is so imbued with the spirit of his organization that he comes to believe that his own interests and those of his company are identical.

An essential to esprit is living up to the motto, "All for one and one for all." Here help is looked for and given within the organization. If a man gets into trouble his first thought should be to tell the captain, feeling that though reproof and admonition will be forthcoming, help will be given. The sense of equity makes a man give help to the limit that he may expect to receive it in return. Where superiors are not fully trusted and relied upon there tends to be a certain amount of passive resistance, which will none the less impair efficiency because it is unconscious.

Where a high degree of esprit de corps exists in an organization, an appreciation of its high quality remains long after the efforts and difficulties that have been through are forgotton. Difficulties overcome in common are, through the instinct of sympathy, but an added bond of interreliance and comradeship.

The articles of war embody with great precision a code of conduct as to what not to do. They are negative and repressive. Under the morale idea it is believed that each organization also should have a positive code of its own, indicating what should be done constructively. If such positive standards were expressed in simple terms and impressed upon the men, they could not fail to have their influence on the modifying of conduct.

Traditions are a powerful factor in creating esprit. They represent the crystallized ideas, needs, and sentiments of the past. They are a controlling force of the greatest power in their effect on the human race, especially groups. The splendid history and traditions of his army should be brought home to the soldier to stimulate his imagination and confidence. When we entered the world conflict Ambassador Jusserand voiced this idea when he said: "I accept the omen; America has never lost a war."

History is similarly of great value in stimulating morale. The accomplishments of a regiment in the past set a standard for the

conduct and achievements of its present members. Lectures, pictures, and the celebration anniversaries of great events are of much value. Regimental anniversaries of great achievements, with formal parades, stirring addresses, competitive sports, and special dinners are very desirable.

To this end the desirability of maintaining pictorial and other historical records of an organization is obvious. For the purpose books of photographs, with proper captions, showing the activities, stations, services, officers, etc., of organizations should be maintained and their looking over by the men, under proper restrictions to prevent damage, encouraged. The same applies to scrapbooks containing newspaper clippings, menus, programs of special events; copies of official war photographs might well be framed and hung on the walls of the company office or recreation room.

Community of service is necessary to esprit. One agency highly destructive of morale is the repeated and often unexplained and apparently unnecessary transfer of officers and men, wrecking laboriously achieved efficiency, pride, and ambition. In organizing new regiments, instead of creating them complete from raw material, the British increased the number of battalions as far as possible in the regiment, so that the new recruits and organizations should have the benefit of honorable traditions and high standards.

Esprit de corps necessarily implies teamwork developed to a high degree. Efficiency is the sum total of many things—some small, some large, but all well done. With any aggregation of men working in a common purpose and toward a common end, success is the success of teamwork. It is the success of getting the most out of each individual and unit and making it count most for the common purpose. In unity there is strength. With unity of purpose goes special interest in the task in hand, so that each individual seeks out and makes use of all opportunities to the fullest extent.

The problem of the superior in handling men is complex by reason of the necessity for making each man do not only what is best for himself but best for others. The stimulus of selfish interest must be subordinated to altruistic motives, for close military relationship imposes careful observation of the rights of others.

It is almost axiomatic in the commercial world that there is no friendship between business organizations; their purpose is that of self-advancement. They function on a competitive basis, with the development of trade secrets of production and management. But within a business organization, friendliness is a great asset. Fortunately outside competition does not apply in armies; instead the higher loyalty calls for cooperation. The individual must subordinate himself, or the unit itself, to the higher needs of the larger

group. There should be mutual confidence for a common end. The reward for sharing a good method comes from having its merits recognized in its adoption for the general welfare. Legitimate competition strives merely to excel in applying common methods to the common object. Mutual helpfulness creates the feeling of loyalty, which is a state of mind expressing itself in teamwork. One factor thus reacts with the other to increased advantage.

Discontent.—Discontent is a factor with which all officers have to deal at one time or another. Although a negative element, it has such bearing on the results of leadership that it may well be discussed here. Under certain conditions of physical and mental environment discontent may become an almost continuous problem. An understanding of the psychology of discontent is therefore of great value in solving the problem in which it is a factor. It is true that they are solvable with great precision and certainty, provided the proper procedure is followed and the correct operations performed at the right time; but just as in mathematics, a wrong sequence of operations, or a wrong operation performed at the wrong stage of the problem will produce an incorrect result.

Discontent in general may spring from an almost infinite number of causes. Whatever the cause of ill temper, a natural tendency is to extend prejudice to other things or persons with which there is contact. In the army, causes of discontent are more limited and can usually be quite readily traced to their source. Lowered morale is invariably attributable to discontent of one kind or another. It must be borne in mind that, psychologically, discontent is caused by the blocking of the denial of adequate expression or satisfaction of one or more of the basic instincts. The first step in the problem, therefore, is to determine which of the basic instincts is at the root of the trouble. With this information in hand the rest of the problem yields more readily to analysis and solution.

A psychological analysis of discontent might divide it into three stages, dissatisfaction, disaffection, and delinquency. These stages are progressive in the order named. The first has its origin in the primary aggravation, while the second and third depend mainly on the intensity, continuation or repetition of the original aggravation. The rapidity of progress from one stage to another or through all three also depends to a very large extent on the continuation, intensity, spread, and repetition of the original stimulus, although the personal element embodied in the individual who is subjected to the aggravation enters in this respect; his characteristics, training, mental balance and development. At any stage of the progress or development of the problem there are one or more appropriate remedial operations which can be applied.

Dissatisfaction, the first manifestation of discontent, strikes at the individual and is what might be called a personal affection. It may spring from disappointment, mortification, vexation, annoyance, regret, opposition, pain, uneasiness; disapproval, displeasure, or an unsatisfied or ungratified state of mind or being. This is the easiest time to apply a remedial operation to the problem, for here it is mainly individuals, at first relatively few in number, who will have to be dealt with; thus rendering the handling simpler than when the problem advances to the group stage. Also it is attacking the trouble at its source. If the morale organization is functioning properly, the first evidences of dissatisfaction will be reported, for this is one of its chief functions. The cause should then be removed by direct or indirect measures.

Dissaffection is dissatisfaction which may pertain only to the individual, but it may have passed on to the group stage and in such cases may be called sympathetic affection. It often reaches this stage as a result of reasoning taking form in dissension, discordance, nonconformity, noncompliance, contradiction, denial, protest, and repudiation, though not always. The result is expressed in terms of antipathetic reaction such as hostility, bitterness, rancor, alienation, disloyalty, dislike, ill will, disgust, estrangement, animosity, and malevolence. The remedial operation is now harder to apply, for the disease has grown and spread. A well-established state of mind must be torn down and a new and favorable one built up. This is infinitely more difficult to do than to attack the problem in its first or dissatisfaction stage, for in addition, the original aggravation must also be removed, which in itself would have solved the problem in the first place.

Before taking up delinquency, the third stage of discontent, it would be well to consider the actual indications of dissatisfaction and disaffection, for at this point in the problem their appearance will be most obvious. Chief among them are complaint and criticism. As they represent the stage of discontent which usually precedes overt act, the importance of recognizing it and taking advantage of its warnings is obvious. Complaints are often the barometer of mental pressure and the indication of impending storm.

The third stage of discontent is delinquency, which is a bad moral condition as well as a bad state of morale. Here the disease, having passed through the preliminary stages, breaks out openly and the crisis is reached. Mental state is given form and expression in act implying disorder, dereliction, offense, misbehavior, transgression, misconduct, and mutiny. It should never have been allowed to reach this stage. Remedial action now becomes a complex and intricate operation, for it is like locking the barn door after the horse has

been stolen. But it must include everything prescribed for the first two stages, namely, the removal of the original aggravation, destroying the existing bad mental state, and building up a new and desirable one. Severe punishment may, under certain circumstances merely add fuel to the fire, but under others drastic measures may be necessary. The remedy must be constructive rather than destructive.

Discontent is thus the direct precursor of delinquency and operates as its cause. The little child, denied some gratification, throws down its toys, stamps its foot, says, "I'll be just as bad as I can," and thus illustrates the relation in its simplest form. The discontented individual, who, denied certain gratifications, slows down his production or practices sabotage to "get even" demonstrates another type. It is a fact that widowers, in the earlier period of their bereavement, and while not yet adjusted to their changed environment, show a higher rate of delinquency in the courts than married men of the same age and class.

Discontent, dissatisfaction, disaffection, and delinquency represent a host of attitudes and tendencies which work counter to any smooth existence or performance. They are the natural sequence which proceeds from maladjustment to environment, whatever its nature. They are the instinctive reaction of the individual against painful surroundings in the effort to secure relief.

The synonyms given under the three stages of discontent call up mental states and reactions which affect physical efficiency exactly as do physical depression, fatigue, and exhaustion. Both reduce snap and effort and lessen initiative and persistence. As interest and desire wane, so there develop indifference, fleeting of attention, sensitiveness, impatience and resentment, with the acts of slovenliness and indifference which express them. The discordance of thought in discontent leads to discordance of action, for the mind is diverted away from common ideals and purposes. All superiors appreciate the obvious effect of physical fatigue upon the performance of work, but many do not realize the similar influence of depressed and disturbed mental state upon the result. The practical efficiency, value of prompt recognition and removal of psychologic irritants should be better understood.

As contentment is a balance between expectation and realization, so discontent implies failure of realization to come up to expectation, with the injection of a strong emotional factor. But expectation implies standards, and these depend upon class and individual. Accordingly, what may be satisfactory to one may arouse discontent in another. The problem of discontent, like any other phase of morale work, thus ultimately resolves itself into the problem of the individual or aggregations of individuals.

Discontent is a state of mind due to an infinite number of causes in varying number and combination. There is, accordingly, no wholesale remedy for it. Each case must be considered on its own merits as to nature, cause and severity. Thus the solution, in final analysis, usually falls on the company commander, but as human nature is more or less the same, general measures carried out by higher commanders will be of essential assistance to the company officers in solving the personal problems of their subordinates.

But as discontent is a most destructive agency to efficiency if poorly handled, so it may be made a helpful stimulus to improvement if wisely directed. In the latter case it is the yeast of progress and has a protective value. It is responsible for efforts at improvement of an environment or for the efforts of an individual to lift himself into more desirable surroundings or status. Hope, anticipation and ambition all have a basis of discontent which is thus turned into a constructive force. Complete satisfaction with a condition implies no desire for change or progress; it means stagnation.

Thus the problem in discontent is to check undesirable influences which tend toward pessimism and relative inefficiency, and to stimulate that discontent which is expressed through ambition and a higher efficiency whose purpose is betterment. Laudable discontent is not only satisfied with nothing less than the ideal, but spurs the individual on in efforts to secure it. It enters into rivalry, and is a ready tool for the commander in inciting an individual or group to a desired task in which advantage can be demonstrated.

Discontent is instinctively understood and imparted. It is carried, and directly and instantaneously read, in the face and in the little hesitations and changes of manner which denote reaction to an unpleasant environment. Under the instinct of sympathy, it tends to be expressed in words, and thus focuses the attention of others on faults or difficulties which had previously been overlooked or disregarded, but which are now magnified into matters of personal importance.

Moreover, as the soldier lives under conditions of life which inevitably bring him into close relation to his comrades, the factor of propinquity favors the development of states of group discontent with a rapidity rarely equaled in any other walk of life. Further, the community and sympathy of thought into which soldiers are molded, combine to accelerate and aggravate the interreaction of mental states, which in many instances find their origin in causes common to all, but affecting different individuals in diverse degrees.

Even a minor grievance or fault, if real, serves as a nucleus about which imaginary difficulties tend to crystallize. The importance to an organizatiaon of constantly seeking out the varying human agents of discontent, and altering their mental states, not only for their own

benefit but for the sake of others, is apparent. The officer, therefore, who regards the contentment of the men as a matter not greatly concerning him, and one for the men themselves to settle, is paving the way for loss of efficiency, individual delinquency, and perhaps group disorder, which he deplores when it occurs but has not taken measures to prevent.

Great causes of discontent in the military service are relatively rare. Difficulties created by the enemy are accepted as part of the inevitable of war. Reasonable efficiency of leadership and supply, and support by the people usually keep other great causes form arising. Petty difficulties, large to the sufferer but small to the onlooker, determine most matters of military discontent. They can only be appreciated and solved by considering them from the soldier's viewpoint. It is, after all, his state of mind, not that of his commander, that needs correction.

Investigation usually shows that most of the difficulties under which a man labors are imaginary and can be cleared away by a proper approach and adequate explanation. They create, by exaggeration, their own bad psychological state. But merely because an officer recognizes a difficulty of a subordinate as imaginary is not sufficient in itself for its removal. The man himself who is laboring under the difficulty must have it shown and proven to him conclusively that his discontent is founded on something unreal.

The final step in the alleviation of any discontent is, of course, the recognition of its existence, nature, extent, and cause. This can only be secured by study and inquiry of the men themselves, using the morale operatives and other agents to full advantage. Suggestions as to the nature of problems of discontent should not only not be repelled but should be elicited.

Immediately on the end of a war or campaign, prompt steps are necessary to combat ennui, homesickness, and belief that there no longer exists necessity for sacrifice. Here the attitude of officers is all important in its effect upon the spirits and morale of the men. In setting a good example officers may be applying desirable methods of prevention or cure to themselves.

Pleasurable activity is the best measure against painful introspection. Interesting tasks keep thought off self and pass away time until adjustment has been better accomplished or the offending agent removed. Work alone is not sufficient. It must be mixed with play, and the character of the play should be varied. The participation of the men as actors, rather than spectators, is essential to the best results.

Complaint and criticism.—By complaint we understand the expression of pain, grief, or resentment; criticism implies censure or an

unfavorable judgment or opinion. Both of these express discontent and disapproval. They usually precede offense or disorder and represent the effort of the individual to put his state of mind into words and thereby relieve his mental tension.

Criticism, as ordinarily employed, is a marked depressant of morale. Used freely and captiously it tends to break the spirit of the subject. On groups it is productive of uncertainty and discord and is destructive of unity of purpose and action. Unjust criticism may rancor for months and, if spoken in the presence of others, may embitter the individual toward whom it is directed. The tendency of criticism is to direct itself less toward things and conditions than toward the persons who are held responsible. It inclines to be not only personal but superficial, often proceeding from false or incomplete premises. The proper values of perspective are often lost.

It is a peculiar psychological fact that men who are prepared to risk all and sacrifice everything are often quite ready to criticize bitterly minor faults and complain of trifles if it appears to them that these faults and trifles are unnecessary and that no military benefit will accrue from their having undergone such discomforts.

After every war or campaign a mental reaction sets in and an epidemic of discontent, homesickness, and criticism results. Marked mental depression occurs and suicide becomes more frequent. The reason for this altered mental state is the sudden withdrawal of the motive which acted as a stimulant to the spirit. Even though duties were unchanged, the force that impelled to effort was withdrawn and had to be replaced by other forces, and the progress of replacement was not always successful.

One of the greatest handicaps to efficiency in our Army is the tendency to criticize to excess, for the American feels at liberty to express his views freely on all subjects. Usually this criticism is based on limited viewpoint or imperfect knowledge. The higher the rank of the critic, the greater his influence and the wider the extent of the damage done. No officer should ever criticize a superior in the presence of subordinates, if he does not wish to weaken his own influence over them. They will be quick to follow his example and, in turn, subject his own methods and himself to unfavorable comment. Moreover, the element of criticism is directly opposed to community of purpose; discordance of thought results either in discordance of act or failure to carry it out to the fullest extent. Paragraph 5, Army Regulations, is the law on this subject of criticism.

Loyalty enters into morale. There must be unswerving allegiance, absolute fidelity, and unchanging support toward leader, organization, country, and cause. When once a plan is adopted by higher authority, or an order issued, it is the duty of all to carry

it out to the fullest extent, in spirit as well as letter. Admiral Jervis once said: "I dread not the seamen; it is the indiscreet, licentious conversations of the officers, and their presumptuous discussion of the orders they receive that produce all our ills."

Helpful criticism, used constructively, is an agent for the disclosure and correction of fault and thus serves a most necessary and important purpose. Fair criticism, if judiciously used, may act like the whip which, occasionally employed, stimulates the draft animal to proper and coordinated effort. But it must be more than the mere showing up of fault; it should carry with it the direction or suggestion of a better procedure. Human progress toward betterment is possible only by constructive criticism of things as they are; the art of war or industry will never crystallize into a perfect science.

Ordinarily, only constructive criticism, in which a better alternative is offered, is good. Such criticism should be invited rather than repelled or resented. The manner in which such criticism is given is important. Courtesy and impersonality are indispensable. These factors largely indicate the intent of the criticism and therefore determine the mental state in which it is received. Sometimes unfair criticism, by provoking resentment, may rouse to activity in the effort to demonstrate its injustice. Like discontent, criticism may thus become a power for good or for harm, depending on purpose, method, and manner of employment.

Complaints and critical states of mind on the part of the men will necessarily be found to exist and will often be reported to higher authority. It is a natural tendency for superiors to resent such criticism, especially if founded on error. But such criticism is not without psychological value, for it enables fault to be traced to its source and gives the men an outlet to ventilate their grievances, real or imaginary. Such "blowing off steam" relieves mental tension. Mental stress in any one is allayed by opportunity to get a doubt or difficulty "off his mind." Men in a depressed or critical state of mind will ordinarily seek to express it to somebody, and it is better to have it come to the attention of those who can correct fault, explain error, or give the personal sympathy unconsciously being sought than to have relief looked for by complaint to the ignorant, misinformed, or irresponsible.

Having an officially available outlet for fair criticism is often sufficient in itself to allay difficulties. Officers should be receptive and sympathetic to the statements of their men, whether the difficulties concerned are general or personal, real or imaginary. An official outlet for complaints has been tried in the "want boxes," similar to the complaint or suggestion boxes in clubs, which were posted in various camps and hospitals for receiving matters of complaint

or opinions regarding things which seemed to require remedy. Experience showed that as soon as a vent for public opinion was created in this way, and its existence and purpose was well understood, the complaints themselves fell off rapidly—almost to the vanishing point. The average subordinate, if he finds that his complaints are given careful consideration, ceases to make them except for strong reasons. He does not, on the one hand, wish to be found in error, and on the other he acquires confidence in the alertness of the superior in the welfare of his men, whereby he can be trusted to determine and correct most defects.

Every complaint should be carefully investigated, whether apparently sound or not. If this is done, unsound complaints will soon cease and the ones received will be those expressing facts and revealing faults which require remedy. Often action can be taken which will result in a particular complaint never occurring again. Acting on complaints is one of the best evidences of interest and builds up good will. What the complainant wants is interest and a decision; he is quite as well satisfied if the latter goes against him provided he is made to see the justice of it.

The manner in which superiors receive complaints is important. If done in a grudging or irritable way, the man feels that there is lack of interest in his problems and that there is small chance of justice being done. Complaints should be listened to patiently. Some are just, some not. But the point is that the complainant thinks he has suffered an injustice. If this be true, the physical fault should be remedied; if not true, his faulty state of mind should be corrected. A fancied ill has the same effect on the individual as the actual existence of the conditions about which he is complaining.

Any serious disagreements among the men should ordinarily be brought to the company commander. Their handling may not be pleasant, but it will generally mean the settling of differences without rancor and to the betterment of morale. In some instances the complainant is at fault. This is not due to intentional error but to misunderstanding. Any undesirable reaction which has developed can readily be removed by a plain statement of facts and an appeal to the individual from the standpoint of explanation, logic, and esprit de corps.

In many matters brought up by aggrieved individuals who want higher authority committed and involved, the wise officer will transpose the words of the sign at the railroad crossing and "Look, listen—and stop." His purpose should be to limit trouble and disagreements in so far as may be consonant with justice. Misunderstanding of orders is quite a prolific source of discontent and trouble. Here explanation is all that is necessary to remove the difficulty.

The apparent disregard of the importance of the time factor in the functioning of the Government machinery is a frequent source of complaint. The latter is so complex and ponderous that the results desired, although finally appearing, are not infrequently delivered too late. Such instances tend to arouse bitterness on the part of those affected and contempt for the efficiency of official methods in comparison with the more direct ones of civil life. Some of the checks on rapid action are matters of law and can not readily be changed. Others depend on regulations requiring too great centralization, resulting in a large number of indorsements by various persons; this it may be possible to amend within the service. Still others, and perhaps the most important and annoying, depend upon failure of administrative officers to give quick decisions and see that the action prescribed is promptly carried out. Here every officer is concerned in so stimulating the transaction of military business as to overcome official inertia.

A few chronic grumblers and ringleaders in discontent will be found in every considerable group. Such pessimists represent separate and individual psychological problems and should be sought out and dealt with appropriately. They represent a type recognized as the unpleasant companion; the tendency of others is to avoid them. It is just this class, however, that should be the particular concern of morale work, not only for their own state of mind but for their reaction on others. Every such case has some reason back of it, and whether this be valid or merely fancied has no effect on results.

This type of men is not easy to handle by direct means. Usually such avoid breaches of regulations, but subtly sap esprit de corps and morale through a passive opposition to authority which is at once doubly dangerous and hard to allay. They are in a way possessed of some qualities of leadership and strong character. The problem is to turn such leadership from a negative purpose to one of positive advantage. This can be done, and not rarely such men can be changed into pillars of strength for the organization, but only after a thorough understanding of the personality of such offenders and a careful selection and application of the agencies which are to bring about the desired change in mental attitude and outward behavior. No two such individuals can be treated alike. Some need praise, others punishment; some responsibility, others change of duty. All will need to have their personal interests and preferences considered in respect to any measures applied.

Knowledge concerning the men.—An old Greek recipe for making a good citizen read: "Know thyself." A modern recipe for making a good officer might equally well read: "Know thy men." Personal leadership is based on an understanding of human nature. "The proper study of mankind is man."

In his book, General Ludendorf said: "There is yet another requirement, an understanding of the morale of one's troops and of the peculiarities of the enemy. . . . The greater the task, the more important do these moral factors become. Confidence and faith in ultimate victory are the bonds which unite the commander and his troops."

In their mental make-up, no two men are exactly alike. But men as a class are much alike. "One touch of Nature makes the whole world kin." Human nature in general, on analysis, will be found to rest on certain general principles. These are capable of broad application, though particular cases require particular handling.

An officer, to have a real hold on his men, so that he can sway their states of mind, must know them and care for them. He must enter their lives, hopes, fears, joys, and sorrows as much as may be proper. Then he will know what they really think and can play upon their mental state as on an instrument of which he has learned the strings and stops. Nor is this subversive of discipline if done with common sense, any more than the kindness of the father is subversive of his son's obedience and general conduct.

The good company officer will know his men not only collectively but individually. His first duty will be to study the roster until he can associate the name with each individual. Every human being appreciates recognition of his personality. One of the greatest assets of a politician is ability to call a name and bring up some incident of identification and remembrance. It means much to discipline to be able to call a man "Smith" or "Jones" instead of hailing him as "you man." The latter blocks the instincts of self-assertion and sympathy and makes the man feel that he is nothing but a cog in a machine in whom the superior has little or no human interest. The training camp plan of having the men wear their names stitched on the left breast is very valuable in the case of recruits whose identity has not yet been fully established.

Also the wise company commander will know his men personally as individuals. He will know their racial and temperamental characteristics, their weaknesses and strengths, their hopes and apprehensions, the things they do well or ill, and the spirit that animates them. He will endeavor to find out about their life before enlistment, their families and friends, and their educational, social, and vocational opportunities. He will constantly endeavor to know their state of mind, their attitude toward the military service in general, their frame of mind toward any local military situation and the minor factors which tend to raise or depress their morale. He should secure such information about their difficulties, desires, and prospects for the future so far as may be done without offense, and should use the information thus acquired to the advantage of the soldier for

the benefit that will thereby accrue not only to him but through him to the organization. He will turn it to practical account so that qualities of weakness may be removed and those of strength increased.

Such knowledge of a man and his capabilities will, in the aggregate, save a vast amount of inefficiency and friction in placing him where his qualifications and talents may be utilized to best advantage. The man himself, as well as his qualification card, should be studied. In studying men, the officer should consider not only their obvious qualities but look for latent possibilities, with a view of developing or curbing them where appropriate. If considered especially adapted to a certain line of work, the soldier should be told where his greatest field of usefulness would seem to lie. While in showing strength, it may be possible without offense to show points of weakness.

Much of the information desired can only be secured from the man himself. This may be tactfully elicited, but unless the man has confidence in his officer much will be withheld; so, too, if he be formally questioned. To get the best results in all matters of personal difficulty, the man should be put at ease by being told to sit down and official military relationship thereby temporarily dispensed with. The company commander should study and understand his organization from the collective standpoint, from race and temperament. Particularly is he interested in the spirit which pervades it, for upon that its efficiency depends. Contact with a number of individuals will give such information.

Where higher officers can not know their men individually by reason of their numbers, they should recognize them as falling under certain types, which in many instances will give reasonably correct ideas as to best methods of approach and management. Superior officers whose rank is such that they can not fully know their men can nevertheless require that their junior officers secure such information.

Leadership depends on a knowledge of human character. Successful leaders always study their men, though this is often done more or less unconsciously and without specific purpose in view. Under morale methods, such study is to be done deliberately, systematically, and thoroughly and as a means of reaching definite ends. No officer can do everything himself, and much must be left to his subordinates. His efficiency is not based upon what he himself can do personally but on what his subordinates accomplish. It is on this that he is rated, and according as the rates are high or low he is classed as a good or a poor officer. Thus the direct relation between knowing men and an officer's own efficiency becomes obvious.

The officer can predict what any soldier will do in proportion as he personally knows his character and the general tendency of his responses to stimulation. From close observation of his organization he can infer with much exactness what the reaction of his par-

ticular group will be toward its environment. He can thus forecast and create reaction and conduct.

Ability to talk to a soldier in a way that indicates a comprehensive knowledge of him as a man is one of the surest ways to his confidence and to creating the belief that, in emergency, his personal interests will be safeguarded as far as possible because they have been recognized. But the officer who attempts to handle his men on the basis of his own personal psychology is doomed in advance to failure. He can work effectively only by recognizing their own psychology through their thoughts, ideals, and acts. These are the basic factors of his problem.

In determining character, everything pertaining to the man should be considered—physical, mental, and moral qualities, appearance, manner, and performance of duty. Attention to the subject, checked up by experience, will give a high degree of proficiency in sizing up men. In this the psychological ratings are of material assistance. While estimation of an individual from personal appearance is useful, it is open to a certain element of error, depending on the knack of the superior in sizing up men. Some men on entering the service are "rough diamonds" who merely need polishing to determine their sterling qualities. Nor is there any common standard of estimate, for one officer may put an overestimate on the value of certain elements where another might underestimate them. The only way to become proficient is by the systematic checking up of first impressions in the light of later acquaintance, thus perfecting the measuring rod of experience.

Another point to consider is the matter of the duty to which the individual is assigned. If this be adapted to him, the result may be the bringing out of all the qualities which were anticipated; but if uncongenial or overdifficult it may cause their repression, resulting in nonconformance to the original conclusion. First estimates should therefore be tentative and subject to modification by experience. A man who may not show up well in one position may demonstrate exceptional efficiency in another.

The proper handling of men calls for patience, tact, judgment, and many other qualities. Knowledge to this end is best acquired by experience, for it includes many things not yet covered by books. Yet, on the other hand, books are invaluable in bringing up suggestions for attitude and administrative conduct which would otherwise, in part at least, be overlooked. The experiences of others form a helpful guide and help to eliminate the mistakes which would result from working entirely on the basis of trial and error.

In large commands it is of course impossible for the superior to know all of his subordinates. Personal knowledge of this sort, like detail of other kind, can only be had by the company officer. But

if the high commander can not know all his men, the next best thing is to have the men know him by seeing him and hearing about him, thereby establishing a sympathetic understanding.

Relation between officers and men.—The relation between officers and men is a subject of much popular interest in civil life. It is also a matter of the greatest military importance in its bearing on efficiency, for the extent of sympathy existing between superior and subordinate determines coordination of purpose and success in result. The administrative relation of the officer to his men is far more extensive and complex than that of persons in charge of men in civil life. The officer is responsible for them throughout the 24 hours. He sees that they are physically cared for, are clothed, housed, fed, and kept free from disease. He has direct or implied responsibility for and power over their morals and conduct. He supervises not only their work but their play. Their interrelations with each other, and with the surrounding community, are a part of his concern. He not only touches every one of their official problems but many which are of a personal nature, and possesses the power to rectify much that may be bad or promote that which is good. He is thus the directing force which exerts pressure on the soldier through the military environment. The tools and agencies are placed in his hands; it behooves him to use them intelligently and effectively.

Many persons in civil life, and quite often officers newly appointed from civil life, can not conceive that there should be any difference in the status or distinction between officers and men when not in formation. Such overlook or choose to ignore the fact that wide divergence in education and other qualities necessarily create differences of character and purpose. They would not expect the general manager and the day laborer in a factory always to find each other mutually congenial. It is of course true, especially in time of war, that there are many individuals of high educational and social qualifications in the ranks who have not yet had time and opportunity to demonstrate their fitness for commissioned status. Such, however, demonstrate no special desire to have social relations with superiors, but rather the reverse, and the same applies to enlisted men as a whole.

As an extreme one finds the occasional tactless officer who, imbued with exaggerated ideas of rank and authority, uses his conferred status to impress subordinates with his military and social superiority. Such assume a caste which has no place in American institutions. Their attitude is resented by subordinates, who quite possibly may be both by birth and education their social and intellectual superiors. This is similarly true in industry.

The wise officer will set a middle course between extremes. His problem is to bring himself as close to the enlisted man as may be

without impairing his status and weakening his authority. He will be on conversational terms with the men, so that they can talk to him freely and frankly without embarrassment or fear. This relation should be personal, frank, and candid. It is not one-sided, but mutual. Military and social status should have nothing to do with it. It is the controlling relation between the head of a family and its members. This does not mean familiarity on either side. There is an old saying that "familiarity breeds contempt," and nowhere is this more true than in military life. Officers who neglect the importance of a certain respect to be paid to rank are never fully successful in the management of their men. Too intimate association sacrifices the element of prestige, which is such an important factor in command. For this reason, relations, while close and cordial, should be sympathetic rather than social.

The relations between officers and enlisted men while off duty are those which any officer of good taste, manners, and judgment will instinctively adopt and which the enlisted men will appreciate without improper presumption. Civilians ignorant of military customs may unwittingly create situations which only tactfulness and good breeding on the part of the officer and men can save from being embarrassing to all concerned, and which should be met in ways most appropriate to the situation.

During the war, the border mobilization of militia, and at other times questions have arisen in connection with the patronage of civilian clubs, etc., by both officers and enlisted men. Many clubs extended their privileges to enlisted men, especially where they were members of other clubs on a reciprocating status. Under such conditions, the club usually took on the character of a "no man's land" in which military rank was not actively presented.

The viewpoint of the men on this subject is shown by their comments on the disciplinary relations between officers and men in questionnaire filled out by 1,381 enlisted men at the time of their discharge after the armistice after an average length of service of from 0 to 6 months. It should be noted that the great majority of their officers were new to the service and inexperienced in management of men. The replies relative to existing disciplinary relations were—

Undemocratic	155
Unnecessary	135
Harsh	140
Necessary but undemocratic	35
Necessary but need not be so harsh	34
Depends on officers	193
Not harsh	295
Democratic	278
Necessary	767
Not replying	174

To the question, "Could discipline be maintained when officers and men mingle on terms of intimacy and familiarity?" the answers were—

Yes	275
No	1,007
Not replying	99

To the question, "Does the soldier lose his self-respect on account of this relation?" the answers were—

Yes	361
No	976
Depends on officer	74
Not replying	65

To the question, "Could treatment be fair if this relation did not exist?" the answers were—

Yes	264
No	1,004
Depends on officer	40
Not replying	73

In the foregoing replies many criticisms were leveled at the overbearing manner in some of the younger, inexperienced officers. Many of the men, however, seemed to see in this attitude merely greater inexperience in the handling of men rather than a desire to be unduly strict with them. Most of the men took the common-sense ground that success in the administrative relations between officers and men depended upon the ability, thoughtfulness, and tact of those in authority. This is obviously an argument for giving not only officers but civilian superiors special instruction and training in respect to human relations in the military service and in industry.

HYPERTHYROIDISM.

By T. W. Reed, Commander, Medical Corps, United States Navy.

No more interesting, and at the same time perplexing, cases have been seen in the medical wards of the League Island Naval Hospital than those of hyperthyroidism. This subject, at the present time is occupying a prominent position in current medical literature, as is endocrinology, the thyroid secretion being one of the foremost of the endocrine chain of internal secretions. Disturbances due to hyperactivity of the thyroid gland are the chief causes of disability, in so far as the derangement of the endocrine system is concerned, with which we, in the Medical Service of the Navy, are concerned. A brief review of the recent literature of hyperthyroidism is, therefore, of interest. The writer lays no claim to individual research

presenting this article, and the subject is far too vast for justice be done it in so short a paper. From observations of patients, om a review of recent literature, and from attendance at lectures the College of Physicians in Philadelphia this collection of facts ncerning hyperthyroidism is set forth.

Hyperthyroidism is a disease which is characterized by excessive atabolism of all bodily tissues, caused by a hypersecretion of the ctive principle of the thyroid gland. The disease occurs most requently in women; but is of quite common occurrence in men; fact, so frequently does it occur in men that it is the cause of a rge morbidity rate in the Navy.

The thyroid secretion has to do with glandular metabolism, cirulation, sex-gland development, detoxication, and emotional equilibium. The absorption of excessive amounts of the thyroid secreon is the direct cause of the symptom complex known as hyperhyroidism. The causes of the increased secretion of the thyroid ormone are very numerous. Toxemia, either chemical or bacterial, generally the cause. All febrile infections, tuberculosis, typhoid ever, scarlet fever, measles, pneumonia, and smallpox, have been nown to cause the hypersecretion; likewise focal infections of the nsils, accessory sinuses of the nose, the genito-urinary tract, teeth, nd the absorption of toxins in enteroptosis.

The neutralization of toxin, from whatever source, is one of the ief functions of the thyroid secretion. The continued increase of ecretion which occurs in chronic, insidious infections causes an inreased metabolic rate, resulting in the formation of the usual katalic poison in excessive amounts. The katabolic poisons in turn erve as an additional stimulant to the thyroid gland, and so, a icious circle becomes established.

It would seem that almost anything to which the human body ight be subjected would cause hypersecretion of the thyroid gland, nd so we have a psychoneural cause of hyperthyroidism. Emotions, articularly when accompanied by trauma, produce increased metablism of the nerve cells. Fear, anger, grief, and prolonged mental train, by subjecting the nerve cells to violent stimulation, bring bout disintegration of, or excessive katabolism in the nerve cells ith the production of phosphoric acid, cholin, and the particularly oisonous substance called neurin, to which the thyroid is particurly sensitive. The thyroid gland reacts powerfully in an attempt neutralize these poisons, with the result that the thyroid hormone self becomes a destroyer of the nerve cells by causing excessive kaabolism of the chromatin and fatty substances, particularly lecithin. hus, another vicious circle is established. We have then (1) the rimary cause of the hyperthyroidism, (2) the excessive amount of

the thyroid hormone, and (3) various toxins resulting from excessive katabolism in all bodily tissues.

The symptoms of hyperthyroidism are exceedingly numerous and vary in proportion to the excessive amount of the secretion. Almost every system in the body is affected. In the circulatory system we have symptoms referable to the heart, palpitation, pains, and a persistent tachycardia of 100 to 120 or even more. The heart is frequently dilated, which dilation results in functional murmurs. Throbbing of the large blood vessels of the neck is fairly constant and distressing. The pulse is fast and thready, and a capillary pulse is often found. The blood pressure is sometimes elevated at first, but is lowered later. The blood picture is that of a secondary anemia a pronounced leucopenia, with a relative increase in the small lymphocytes. The nervous system is markedly affected. Tremors are fine and of the intensive type. In severe cases, the entire body trembles. The reflexes are increased. Sometimes there are evidences of hysteria and neurasthenia and hallucinations. At times, the mental picture is one of hyperactivity of the intellectual centers. At other times, these patients are apathetic and depressed. Melancholia is of frequent occurrence. Often suicidal and homicidal tendencies occur. Sometimes these patients present a peculiar wild facial expression. Barker states that this expression is peculiarly characteristic to hyperthyroidism and, in a great many cases, the diagnosis can almost be made from the appearance of the face. One such case, with this peculiar facial expression, has been under observation in this hospital for several months. Thyroid intoxication is not infrequently the cause of a type of mental aberration similar to maniac depressive insanity.

The gastro-intestinal symptoms are mainly nausea and vomiting, abdominal distress and diarrhea. Usually there is a hyperchlorhydria. The sexual system is usually depressed, there being a decrease in desire and ability.

The thyroid gland is usually swollen and soft, comparatively smooth and compressible, and occasionally it is tender. A pulsative expansion is usually felt and seen and a systolic murmur heard over the gland. The intoxication sometimes comes from an accessory or an intrathoracic gland, so do not place too much reliance, when trying to make a diagnosis, on the absence of enlargement of the thyroid gland itself. A very severe case, now under observation, shows very little enlargement of the thyroid gland.

The symptoms referable to the eyes are usually very distinct and among them the most prominent are—

(1) Lagging of the upper lid when the eye follows the finger downward; this is Von Graefe's sign.

(2) Retraction of the lids, resulting in enlarged palpebral fissures; his is Dalrymple's sign.

(3) Difficult eversion of the upper lids, Gifford's sign.

(4) Infrequent winking, Stellwag's sign.

(5) Impairment of the power of convergence. Moebius' sign.

(6) Spasmodic contraction of the upper lid when the eye first ttempts to look at a finger.

(7) Paralysis of ocular muscles.

(8) Last, but not least, exophthalmos. All degrees may be seen. The exposure to which the eye is subject and also the paralysis of he nervous supply cause drying of the epithelium of the cornea, nd ulceration of so violent a type as sometimes to produce destruc- ion of the eye. New vessels may develop in the lower part of the ornea on account of the exposure through the widened palpebral ssure. The corneal changes necessarily occur in the severe types of he disease where the exophthalmos has been considerable. A hythmical systolic murmur is sometimes heard over the globes and ue to the widened palpebral fissures, the eyes of most of these pa- ients have a peculiar luster and a staring or fighting expression.

The skin is often flushed and one or two degrees above normal in emperature. Excessive sweating is common. The metabolic rate is ncreased anywhere from 10 to 100 per cent above normal, this in- rease being directly proportional to the amount of the excessive hyroid secretion.

Several diagnostic tests are of much value. The metabolic rate, s determined by either of several apparatuses, is always increased, nd the increased rate is always directly proportional to the amount f the thyroid intoxication. The hypodermic injection of 8 minims f a 1 to 1,000 solution of adrenalin causes an increase of from 10 o 50 in both pulse and blood pressure. This increase is followed y a fall and then a secondary rise, returning to normal in about n hour and a half. The injection of adrenalin also causes an exag- eration of all the symptoms of hyperthyroidism. The lavender rea, which usually develops around the site of the injection, lasts in ases of hyperthyroidism from one-half to two and one-quarter hours. he instillation of 8 minims of a 1 to 1,000 adrenalin solution into ne eye, in cases of hyperthyroidism, causes a dilation of the pupil. igitalis has little or no effect on the heart beat. Cases of hyper- hyroidism have also a low glucose tolerance. One hundred grams f glucose fed to a normal individual does not cause a hyperglycemia, ut this amount, even in border line cases of hyperthyroidism, causes marked hyperglycemia. The complement fixation tests are still the experimental stage and are of no practical value as yet. The

administration of thyroid extract is to be overwhelmingly condemned.

As might be expected of a disease like hyperthyroidism, which is caused by so many different conditions, so, too, a varied line of treatment is offered for its relief. The first thing is to find the chronic focal infection, the cause of the hypersecretion, and remove it. Rest, good nursing, pleasant quiet surroundings, warm fresh air, two sponge baths a day, an ice bag to the cardiac and thyroid regions are all beneficial. Absolute mental and physical rest are essential in some cases. Due to the excessive katabolism, which occurs in hyperthyroidism, a very nutritious diet is necessary to overcome the katabolis loss. The diet should consist of milk, buttermilk, cream, butter, cheese, eggs, plenty of bread, vegetables, soups, stewed fruits, carrots, and simple puddings. All meats should be interdicted, as proteins increase the thyroid secretion, and carbohydrates substituted, as it has been shown that the latter tend to decrease the thyroid secretion. All stimulating beverages should be omitted as harmful.

Medical measures constitute a most important part of the treatment of this condition. These measures are for the reduction of the thyroid secretion and the rebuilding of the tissues, debilitated by the excessive katabolic processes. The best agents are vaso-constrictors, such as quinine, ergot, and the salicylates. Pituitary extract adrenalin, scopolamin and spartein also help. Bromides and veronal are helpful in relieving the nervousness and insomnia. Arsenic, particularly in Fowler's solution, tends to depress the function of the thyroid. A good combination is a capsule containing bromide of quinia, three grains; extract of ergot, one grain; and extract of belladona, one-thirtieth of a grain, given three times a day. Proper laxatives should be administered to maintain the intestinal function and iron in one of the various forms as a tonic and for the anemia.

Psychotherapy is beneficial in all cases and absolutely necessary in some. Complete confidence of the patient is absolutely necessary, as most of these patients are sick in mind as well as in body, and must be treated accordingly. The X-ray is a most excellent agent for depressing the excessive secretion of the thyroid. It is painless and easy, causes no deaths or scars, and when applied in connection with proper medical treatment produces excellent results. Radium when given properly and in sufficiently large quantities will produce equally as good results as will the X-ray. Radium may succeed where X-rays fail, and vice versa. Neither should be applied to produce a dermatitis. Injections of boiling water into the thyroid gland have produced good results in some cases; but has also caused

some deaths. Injections of hydrochloride of quinia and urea have produced encouraging results.

Surgical treatment should be applied only when all other lines of treatment have failed. Surgical treatment has been the form of therapy most often used, probably because the statistics are considered in the wrong light. The mortality from thyroid operations when done by Kocher and the Mayos is practically nil. Judd and Pemberton of the Mayo clinic have shown, however, that, eight years after operation, not more than 45 per cent of the cases are cured. When all other forms of treatment have failed, surgery is in order. When pressure symptoms develop or malignant degeneration occurs, surgical intervention is necessary.

Sympathectomy has been practiced for the relief of the exophthalmos, and partial thyroidectomy has met with great success. However, surgeons and clinicians differ on the merits of these operations. It may be that the surgery of the future will confine itself to the removal of the causes of the hypersecretion. Bram, of Jefferson Medical College, Philadelphia, thus sums up surgery of exophthalmic goiter:

"Surgery is indicated in Graves disease when—

1. Marked pressure symptoms of cervical and thoracic structures are evident.

2. Malignant degeneration of the thyroid occurs. As a rule, these are unusual in thyroid hyperplasia.

3. A local structure—tonsils, appendix, pelvic abnormalities, teeth and so forth, which by a careful process of exclusion is found to have an etiological bearing on the syndrome. Surgical removal of such diseased structures, in breaking the continuity of the vicious circles, upon which the symptom complex depends, may bring about a cure.

"Surgery is contraindicated in the vast majority of cases for—

1. The pathogenesis of the disease points to the thyroid as playing but a small part in the causation of the syndrome.

2. The symptomatology of the affection is as widespread as the body itself, favoring strongly the pluriglandular theory.

3. Physiology indicates that, in human beings, it is almost as dangerous to attack surgically an overactive vital organ, such as the thyroid, as to attack surgically an overactive heart.

4. On clinical grounds, Graves disease does not fall in the realm of surgery, as indicated by the considerable mortality rate and frequent operative accidents—namely, myxedema, tetany, vocal paralysis, postoperative sequellae, acute exacerbations, acute psychoses, recurrences, and the lack of conclusive evidence of surgical cures. As has been suggested, surgical interference with the thyroid, by reduc-

ing the recuperative powers of the patient, prolongs the state of invalidism and favors profound degenerative changes of the tissues of the nervous and circulatory systems, rendering the prognosis less favorable and the task of the internist tedious.

5. On empirical grounds Graves disease belongs strictly in the field of the internist who, having made endocrinology his field of special endeavor, is capable of demonstrating complete and permanent nonsurgical cure of every case of the disease in which vital structures are not badly damaged and a reasonable degree of cooperation is obtainable."

HISTORICAL.

THE HISTORY OF ANESTHESIA IN AMERICA.[1]

By J. S. Taylor, Captain, Medical Corps, United States Navy.

Conflicting claims for priority in the use of ether to prevent the ain of surgical operations have needlessly confused a very simple natter.

Valerius Cordus, a botanist of great promise, who was born in Prussia in 1515 and died at the age of 29, discovered sulphuric ether. Three hundred years later (1815) was born Crawford Williamson ong. He was a native of Danielsville, Ga. After graduating in nedicine at the University of Pennsylvania and studying for a year n New York he settled down to practice his calling in his native own. Some of the young men of the place were in the habit of aking laughing gas from time to time merely as a lark. On one ccasion they applied to Dr. Long for a supply, but as he had none e suggested ether as a substitute, for he knew that it was intoxicat- ng. He even took it himself once or twice, joining in the merry- naking of the young village sparks. Having noticed that accidental umps and bruises received during the course of an evening's frolic aused no pain and passed unnoticed by those who received them he dministered ether by inhalation to remove a small cystic growth rom a patient's neck. This was in 1841. By the end of the follow- ng year he had employed it eight times in minor surgery with nvarying success.

Dr. Long was not fully satisfied in his own mind as to the degree o which ether would kill pain. He was circumspect and scientific nough in spirit to appreciate the possibility of error. He conceived hat there might be an element of hypnotism,[2] catalepsy or some indred nervous phenomenon in the matter and wished to convince

[1] Attempts to produce some degree of relief from pain during surgical operations are s old, perhaps, as orthodox surgery itself. During the Middle Ages, and notably by the talian surgeons of Salerno, Bologna, etc., the "soporific sponge" was in general use. go Borgognoni, of Lucca, at the beginning of the thirteenth century, used opium, man- ragora, henbane, lettuce, ivy, mulberry, sorrel, and hemlock boiled with a new sponge. his was dried and later wet in hot water. The "Breviarium," ascribed to Arnold of illanova, directed to take opium, mandragora bark, and root of henbane, equal parts, ound up together, and add water. "When a man is to be cut or sewed up, dip cloth in his mixture and apply it to forehead and nostrils. He will soon go to sleep so pro- oundly that you may do what you will."

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[2] Hypnotism had been successfully used by Esdraile, an English surgeon, in India for me 200 operations before the introduction of anesthesia.

himself, by employing ether in a major operation, that the substance really had the virtues he supposed. Unfortunately, the opportunity for this more rigid trial did not present itself. Dr. Long lived far from the centers of medical learning. He was a modest, retiring, gentlemanly country doctor and perhaps lacked the imagination to grasp the magnitude of what he had done. He did not write for the medical journals, he was not a surgeon, there were no eminent men and no great surgical hospitals in his vicinity to help him test and exploit the discovery.

In time the pain-killing properties of ether were independently discovered by others more happily circumstanced as regards public demonstration and recognition. Doctor Long then naturally desired to have his name connected with the original discovery, though seeking no pecuniary reward for it; but the world has very properly ascribed the credit to the man who, in deliberately searching for something to alleviate pain, found by careful experimentation what ether could do, submitted it to public and impartial tests, and brought it to the attention of the profession, because, as far as Long was concerned, mankind might have gone on for years without enjoying the incalculable benefits of ether as a general anesthetic. Doctor Long's connection with ether has a pathetic side. Such incidents have been common in all ages and show how widely the famous lines of Gray's Elegy may be applied. However, unlike the other men connected with the great episode, Long was little disturbed by it. He lived a tranquil, happy, busy life among his own people, loved and esteemed by them, and died at 62, leaving $40,000 to his heirs.

In 1800 Sir Humphry Davy had taken laughing gas experimentally and hazarded the opinion that nitrous oxide might be available for surgical use.

In 1844 a dentist of Hartford, Conn., Horace Wells by name, began to use nitrogen monoxide in his practice. He had been told by a Doctor Marcy, of Boston, that ether was available, but preferred to keep to the nitrous oxide until he had the misfortune to lose a patient by it. To him, perhaps, belongs the credit of having inspired his partner with the idea of anesthesia in dentistry. This partner was Thomas Green Morton (1819–1868), of Worcester County, Mass., a graduate of the first real dental school in the United States—the Baltimore College of Dental Surgery—which had just been established. Morton was the originator of a new method of inserting artificial teeth which promised very large pecuniary returns, but the severe pain which attended putting them in and the huge doses of opium he had to employ (500 drops of laudanum distributed over a period of 45 minutes) so reduced the number of applicants for the treatment through fear of being poisoned that the method

threatened to be a failure unless some other way of attenuating the pain could be found. This was the stimulus under which Morton labored.

He had originally wanted to be a doctor, dentistry being the alternative forced upon him by circumstances. He now undertook the study of medicine under Dr. Charles T. Jackson, of Boston, and later matriculated at the Harvard Medical School. This was, in one way, a real sacrifice on Morton's part, for it involved largely reducing a practice already lucrative, though he was but 25 years of age. At Dr. Jackson's suggestion, Morton experimented with ether used locally. It proved unsatisfactory, and he went on experimenting upon animals. Finally he persuaded his two assistants to allow him to give them ether by inhalation, all offers of reward having failed to secure a volunteer for the trial. The result of this test was not gratifying, and when Jackson was appealed to he advised looking to the purity of the material employed. Morton next tried the effects of ether upon himself and has left a record of his sensations. There was something heroic, some of the sublimity which characterizes most great enterprises, in his shutting himself in his office without witnesses or assistants and boldly inhaling the little-understood and perhaps deadly vapor. On the same day, September 30, 1846, he secured the permission of a patient who wanted a tooth extracted to have this done under ether.

On October 16, 1846, by invitation of the Massachusetts General Hospital, conformably with the suggestion of Dr. J. C. Warren, Morton publicly administered ether in that institution. On October 17, Dr. G. Hayward followed Warren's initiative by a more serious operation, Morton giving the ether with satisfactory result.

These were memorable demonstrations. They mark the most signal advance in surgical procedure, except that made possible by the work of Pasteur and Lister, that has yet been achieved. However much we may deplore the loss of manual dexterity that inevitably followed the elimination of time as a factor in operations, we must recognize how vastly the field of surgery has been expanded by anesthesia. Not only is the avoidance of pain to the individual patient an incalculable blessing, but the number of those who can be treated by the knife—the very young, the very old, the delicate, those incapable of enduring the shock of pain—has been enormously increased. It has taken us from the restricted field of "operations of necessity" to the boundless one of "operations of election." The apprehension of pain no longer deters a patient from seeking relief in the early stages when benefit may be most confidently expected; the absence of pain and the reduction of shock permit the surgeon to do more accurate as well as more extended work.

Some weeks elapsed after the notable demonstration at the Massachusetts General Hospital without further employment of the new device, owing to the fact that the material used was a secret, Morton having patented it under the trade name of "letheon." On learning of the ethical objections advanced by the hospital authorities, Morton promptly informed them that the substance in question was sulphuric ether and formally tendered its use, free of charge, to the Massachusetts General Hospital.

Morton at the time was vituperated and maligned for his conduct in relation to ether, and he seems in the main to have acted most injudiciously but not ignobly. He was but 27 years old when he succeeded, after much time and effort, in elaborating an anesthetic. Naturally he desired to reap some material advantages from his toil, the more that his prime motive in the whole undertaking was to enable him to carry out in his dental practice the original methods he had devised. At first, he had probably not contemplated the immediate and widespread adoption of ether for general surgery. The prompt announcement of the nature of the drug and the offer of it free to the hospital showed a commendable spirit. The patent, of course, yielded him nothing. Morton could not object to the use of a substance already known and in no sense his. "Letheon" alone was his, but it mattered little as regards its action by what name the agent was called. The Government, for instance, after granting the patent, employed ether in the medical department of the Army and Navy!

Poor Morton had made elaborate plans for selling his secret to those who wished to make use of it, and when people found that they had a perfect right to use ether instead of "letheon" and could get the same results he was immediately involved in litigation which ruined him financially, destroyed his prospects and his health, and wrecked his happiness. He got nothing from a parsimonious Congress except a partial recognition of his title as originator of anesthesia and would have died of want but for the subscriptions taken up on his behalf, the medical profession, as always in similar cases, contributing with great liberality.

Morton cheerfully recognized the extent to which he had been debtor to Wells and Jackson for assistance, but rightly maintained that he and he alone had, by repeated experiments and finally by public demonstration, established the value of etherization. Jackson acknowledged that he had no claim in the matter comparable to that of Long, but there had been a lack of frankness on Morton's part which justified Jackson in thinking that the idea of using ether was his own, for Jackson had suggested this to Morton in the presence of four witnesses, and the latter had seen fit to preserve abso-

lute silence about researches and experiments already begun by him and still in progress along that line at the time of the conversation. Morton's reticence under the stress of great excitement, on the verge of reaping the success for which he had labored so earnestly, was natural, but it did his instructor, Dr. Jackson, a gross injustice. On the strength of it Jackson assumed that the pupil had derived his ideas from the teacher and was led to put forth claims which he could not substantiate when all the facts became known.

It is sad to relate that Wells committed suicide and Jackson went insane. Morton's career was a failure, and only Long enjoyed a happy old age.

Sir James Young Simpson, the eminent obstetrician of Edinburgh, was quick to see the huge benefits which the discovery would bring to suffering women and used it for his patients within less than a year of its public demonstration in Boston, but in a few months he took to chloroform (discovered by Liebig, Guthrie, and Soubeiron) instead. Writing in 1848, he expressed surprise that anesthesia had not yet been employed in labor by the physicians of London or Dublin. Simpson was assailed by the divines of the period for attempting to mitigate the pangs of the parturient woman. They maintained (not having to endure it) that the suffering was intended by the Lord for the women's own good. To dull the pains of labor was to run counter to the designs of Providence, so they said. Sir James replied with an argument from the Scriptures as apt as it was effective by reminding this narrow-minded gentry that the first authentic operation under anesthesia was that performed by God when he threw Adam into a deep sleep, preliminary to removing a rib with which to construct Eve!

A HISTORY OF BLOOD TRANSFUSION.

By W. M. Kerr, Lieutenant Commander, Medical Corps, United States Navy.

When speaking of things pertaining to the medical profession, one hesitates to state that anything approaching perfection has been reached in any line of treatment. An eminent surgeon in London about the middle of the last century once told his students that surgery had reached perfection, that few if any advances were to be expected, little dreaming that in another portion of the city Lister was making researches which would revolutionize surgical practice. So, when regarding the present-day method of blood transfusion as perfect we may be in error; nevertheless the process has reached such perfection and is so simple that we may look for few improvements in the technic in the future. The perfection reached is the

outgrowth of years of experimentation, and a glance backward over those years is not without interest.

A Doctor Roussel, of Geneva, wrote a little book on blood transfusion, which was translated into English in 1877, with a preface by Sir James Paget. In it he says: "On comparing and examining the works of various authors on transfusion this operation is found to have been the means of saving life from the time of Blundell, 1820, to the end of 1875, in at least 80 cases of women dying from hemorrhage in confinement, in 30 cases of wounds of war or of surgical wounds, in 50 cases of diseases of the blood or anemic consumption, in 20 cases of typhus, cholera, syphilis, dangerous fevers, and in 10 cases of blood poisoning—nearly 200 authenticated cases of patients who have been rescued from death in a period of 50 years by the generosity of persons who have given them their blood, and by the skill and confidence of the operators."

It has been stated that the Egyptians, the Hebrews, and the Syrians practiced transfusion, and there are said to be Greek and Roman writers who speak of having witnessed it. Whatever may have been done in ancient times, we know that toward the end of the fifteenth century the operation was claimed to have been performed on Pope Innocent VIII, the 225th Pope. An account of this case will be found in Villari's Life of Savonarola. The Pope had had an apoplectic stroke the year before, and he was now an old man whose vital powers were rapidly giving way. At last "he had for some time fallen into a state of somnolency which was sometimes so profound that the whole court believed him to be dead. All known means to restore his exhausted vitality had been resorted to in vain, when a Jew doctor proposed to try to do so by the transfusion, with the assistance of a new instrument, of the blood of a young person—an experiment that hitherto had only been made on animals. Accordingly, the blood of the decrepit old Pontiff was passed into the veins of a youth, whose blood was transfused into those of the old man. The experiment was tried three times, at the cost of the lives of three youths, but without any effect." The Pope died July, 1492. The story of the Pope's transfusion has been a source of controversy from time to time since Villari first told it. Old books exist in which is recorded a different and probably more truthful version of the operation. Eccardus, in his "Corpus Historicum Mediaevi" (1723), quotes from the Diarium Urbis Romae of S. Infessura, and from it we see that, although it is affirmed that blood was taken from the three boys, all of whom died, there is no mention of its being passed into the Pope's veins, much less that the blood of the Pope was passed into the veins of the boys, or that any new kind of instrument was used in the operation. It is not stated in what manner it was proposed to use the blood, or whether it was used at all.

In the Annales Ecclesiastici of Baronius and Raynoldo (1745) there is an allusion to the Pope's death, and in this version we have the story of the three boys having died from the operation of venesection, performed by the Jew, but it is not said that the blood was used for transfusion. On the contrary, it is stated that the Jew wanted to give the blood to the Pope as a drink and that the Pope angrily refused it.

This is probably the true version, as the drinking of blood was not uncommon in medieval times; but the version of Villari persists and appears from time to time. Even that great authority, F. A. Symonds, in his Renaissance in Italy (1879), repeats the story that a Jewish doctor proposed to invigorate the Pope by transfusion and that three boys, as he dramatically expresses it, "throbbing with the elixir of early youth, were sacrificed in vain."

Another version of Villari's tale is found in the Life and Times of Rodrigo Borgio, written by A. H. Mathews and published in 1912.

"Three boys were bled until they died, and the Pope drank a draught prepared from this blood without benefit."

The next allusion to blood transfusion to be found in medical literature appears in the writings of Libavius, a chemist of Halle, who, in his "Appendix Necessaria Syntagmatis Arcanorum Chymicarum" (1615), describes the operation of the transfusion of *arterial* blood of one person into the veins of another, but only to criticise and condemn it, for he says that the physician who performs the operation must be out of his senses.[3]

According to another writer,[4] Libavius wrote as follows: "Let there be present a robust, healthy youth, full of lively blood. Let there come one exhausted in strength, weak, enervated, scarcely breathing. Let the master of the art have silver tubes that can be adapted one to the other: then let him open an artery of the healthy man, insert the tube, and secure it. Next let him incise the artery of the patient and put into it the female tube. Now let him adapt the two tubes to each other and the arterial blood of the healthy one, warm and full of spirit, will leap into the sick one, and immediately will bring to him the fountain of life and will drive away all languor."

Sir Christopher Wren, about the year 1656, when at Oxford, performed the experiment of injecting into a dog's veins various material, such as ale, wine, scammony, and opium in an endeavor to develop a new method of administering drugs.

In 1664, Daniel, a German physician, described the operation which he had for some time used for transfusing blood from a healthy

[3] Writings of John W. Ogle, M. D., late consulting physician to St. Georges Hospital, London.

[4] History of Blood Transfusion, B. D. McClure. J. Mich M. Soc. 1917, p. 178–184.

man into the veins of another; and about this time the names of Graaf of Holland, Fracassetti of Pisa, and Munfredi of Rome appear in connection with the operation.

Wren's experiments attracted the attention of the Royal Society, and at a meeting in 1665 it was proposed to try the transfusion of blood. The attempt at first was not successful, owing to a lack of proper apparatus, which, however, was soon perfected after a fashion, for in 1666 Pepys, in his Diary, makes several curious and quaint allusions to the practice of blood transfusion. On November 15, 1666, he wrote: "Dr. Croone told me, that, at the meeting at Gresham College to-night * * * there was a pretty experiment of the blood of one dog let out, till he died, into the body of another on one side, while all his own ran out on the other side. The first died upon the place, and the other very well, and likely to do well. This did give occasion to many pretty wishes as of the blood of a Quaker to be let into an archbishop, and such like; but, as Dr. Crone says, may, if it takes, be of mighty use to a man's health, for the amending of bad blood by borrowing from a better body." The Dr. Croone whom Pepys mentions was William Croune, of Emanuel College, Cambridge, chosen rhetoric professor at Gresham College, 1659, F. R. S. and M. D. He died in 1684 and was interred at St. Mildreds in the Poultry, London.

On the day following, Pepys recorded the fact that at noon he "met with Mr. Hooke, and he tells me the dog which was filled with another dog's blood at the college the other day is very well, and like to be so as ever, and doubts not its being found of great use to men, and so do Dr. Whister who dined with us at the tavern."

Under date of November 21, 1667, he writes, "With Creed to a tavern where Dean Wilkins and others, and good discourse, among the rest of a man that if a little frantic hath been a kind of minister, Dr. Wilkins saying that he hath read for him in his church, that is a poor and a debauched man, that the College have hired for 20 shillings to have some blood of a sheep let into his body, and it is to be done on Saturday night. They propose to let in about twelve ounces; which they compute, is what will be let in a minutes time by a watch."

And on November 30, 1667, he made the following entry: "I was pleased to see the person who had his blood taken out. He speaks well, and did thus give the society a relation thereof in Latin, saying that he finds himself much better since and as a new man, but he is cracked a little in his head though he speaks very reasonably and very well. He had but 20 shillings for his suffering it, and is to have the same tried upon him a second time: the first sound man that ever had it tried on him in England, and but one that we hear of in France."

The credit of perfecting the apparatus which made blood transfusion feasible at that time is due to Dr. Lower of Oxford, who, together with Dr. King, performed the operation of transfusion successfully in February, 1665. He submitted to the president of the Royal Society (May 6, 1666) his method of procedure in conducting the operation of transfusing the blood of one animal into another; and his description was imparted to the Royal Society, and is recorded in the Philosophical Transactions for December 17, 1666. This is the first authentic scientific document upon the operation to be found in medical literature. Lower at first employed quills and later a silver tube to convey blood from the carotid artery of one dog to the jugular vein of another dog. He reported the cure of a mangy dog in 10 days after transfusion with the blood of a healthy dog, and he reported in detail the experiment of transfusing the blood into human veins by Dr. Arthur Coga, November 23, 1667. The patient was bled seven ounces and then joined to the artery of a sheep by means of a silver tube. The transfusion continued two minutes. It was estimated that 9 or 10 ounces were received into the man's veins. "The man, after the operation, as well as in it, found himself very well."

The Dr. King who was associated with Dr. Lower was Sir E. King, the physician, who on February 2, 1684, performed an emergency venesection on Charles II, who had suffered a stroke of apoplexy. For this act Dr. King was awarded £1,000 by the Privy Council, but he never got the money.

John Evelyn in his Diary under the date of February 4, 1684, made the following entry regarding the illness of Charles II, which has nothing to do with the subject of blood transfusion, but which throws light on medical treatment at that time:

"I went to London, hearing his Magesty had been the Monday before (2 Feb.) surpriz'd in his bed-chamber with an apoplectic fit, so that if, by God's providence, Dr. King (that excellent chirurgeon as well as physitian) had not been accidentally present to let him bloud (having his lancet in his pocket) his Ma^{ty} had certainly died that moment, which might have ben of direful consequence, there being nobody else present with the King save this doctor and one more as I am assur'd. It was a mark of extraordinary dexterity, resolution, and presence of mind in the D^{r}. to let him bloud in the very paroxysm, without staying the coming of other physitians, which regularly should have been done, and for want of which he must have a regular pardon, as they tell me. This rescu'd his Ma^{ty} for the instant, but it was only a short reprieve. He still complained and was relapsing, often fainting, with sometimes epileptic symptoms, till Wednesday, for which he was cupp'd, let bloud in both

jugulars, had both vomit and purges, which so relieved him that on Thursday hopes of recovery were signified in the Publiq Gazette, but that day about noone, the physitians thought him feaverish. This they seemed glad of, as being more easily allay'd and methodically dealt with than his former fits; so as they prescrib'd the famous Jesuits powder, but it made him worse, and some very able doctors who were present did not think it a fever, but the effect of his frequent bleeding and other sharp operations us'd by them about his head, so that probably the powder might stop the circulation, and renew his former fits, which now made him very weake. Thus he pass'd Thursday night with greate difficulty, when complaining of a pain in his side, they drew 12 ounces more of bloud from him; this was by 6 in the morning on Friday, and it gave him reliefe, but did not continue, for being now in much paine, and strugling for breath, he lay dozing, and after some conflicts, the physitians despairing of him, he gave up the ghost at half an hour after eleven in the morning being the 6 of February 1685 in the 36th yeare of his reigne, and the 54th of his age."

One of the earliest books on transfusion is a little volume published by J. S. Elsholtz, called "Clysmatica Nova, Etc.," the second edition of which appeared in 1667, in which the "Ars enematica" is described. The author had made experiments in 1660 similar to those made by Wren and Lower. His experiments were devised apparently from a desire to discover a method of introducing medication other than by mouth, and he cites instances in which remedies in solution might be administered by means of injection into the veins with more effect than by the mouth. In this book the author seriously suggests that the temperament of persons might be regulated by venous injections; for instance, the blood from a phlegmatic person might be injected into the veins of a choleric one, or the blood of husbands and wives of irreconcilable dispositions might be beneficially mixed by venous injection.

In 1667, Jean Baptiste Denys, of Paris, the physician of Louis XIV, after experimenting on animals, successfully transfused the blood of a sheep into the veins of a boy suffering from lethargy. In the same year he transfused the blood of a calf or a lamb into the veins of a young man dying from repeated venesections. The patient survived and apparently recovered his health.

Denys' investigations got him into difficulties with the authorities for he was arrested and brought to trial for the death of a man whom he had transfused. In his defense at his trial Denys produced two persons who testified that the physician had caused them to recover from serious illness by the operation after they had been given up by other physicians.

Failures in transfusion with loss of life set public opinion against he operation and led to the abolition of the process as far as the Royal Society was concerned, and in France the Parliament of Paris n 1688 made the operation criminal except with the sanction of the Faculty of Paris.

The celebrated surgeon Scultetus described the operation of transusion and the injection of various remedies into the veins in his Armamentarium Chirurgicum Renovatum et Auctum in 1672, and e gave the bibliography of the subject at his time.

In 1668, Santinello, an Italian physician, wrote a book with a ong Latin title to discredit the operation, and in 1679 Mercklin, of Nuremberg, published his De Ortu et Occasu Transfusionis Sanuinis, the main object of which was to throw discredit on the peration of transfusing blood from animals into man. In it he ttempts to show that transfusion is neither useful for prolonging ife nor for the cure of disease, but that it is dangerous and inurious. He mentions the fact that two men died in Rome after ransfusion, and the Pope had prohibited the practice.

In 1706, an English translation of a book, Chirurgia Curiosa, vritten by Purmann, a surgeon of Breslau, was published. It conains a chapter headed "Of chirurgical infusion and transfusion, nd why they are in no greater reputation in the world."

Heister, in his Institutiones Chirurgical, published in 1739, has a hapter, "De chirurgica infusoria et transfusoria." He gives the ndications for the operation, describes the procedure and the intruments required, and devotes some space to the history and literture of the operation.

After the publication of Heister's book we read no more of the peration of blood transfusion for 120 years. It seems to have allen into disrepute, probably as the result of the opposition of ublic opinion to the operation.

In the year 1818, Blundell, who was lecturer on physiology and nidwifery at St. Thomas' and Guy's Hospitals, performed a series f experiments on the utility and practicability of the operation. n his Physiological Observations and Experiments, published in 824, he mentioned the fact that some bloods are more coagulable han others.

After Blundell many physiologists devoted time to the problem f blood transfusion, especially Milne and Brown-Seguard. In 835, Bischoff introduced the idea of injecting defibrinated blood; his method became popular for some time with a large group of perators.

An interesting résumé of the history of transfusion was pubished in 1872 by Dr. H. Leisrink, of Hamburg. In it he, too, brings

up the question of the use of defibrinated blood in place of blood in its natural state.

Dr. Wm. S. Halstead, in an article "Refusion in the treatment of carbonic oxide poisoning," published in the Annals of Anatomy and Surgery, January, 1884, reports several cases of carbon-monoxide poisoning treated by transfusion or refusion of blood. He first drew the blood, defibrinated it, and then reinjected it into the patient.

Although Blundell, in 1818, used a syringe in his experiments he was unable to transfer much blood. The first report on the practical transfusion of blood by means of several syringes was made in 1892 by Prof. von Ziemssen, who first injected whole blood subcutaneously, but later injected it through a needle into the vein of the recipient.

The next great steps were made in this country chiefly in the line of simplifying the technic and making more sure of success in transferring a sufficient quantity of blood from the donor to the recipient.

The work of Carrel on the direct, successful, end-to-end suture of blood vessels, and that of Crile, who employed the cannula, added a new interest and have made possible the transfer of blood without the former danger of clotting and subsequent embolism, but the main objection to their methods and all modifications of them is that they cause a considerable amount of inconvenience to both donor and recipient, and the amount of blood transfused can not be easily determined absolutely.

Carrel's success was due mainly to most rigid aseptic technic and the prevention of blood clotting in the wound or in the several blood vessels during the operation by means of careful hemostasis and saline irrigation. Crile's success was due to the fact that the intema of the vessels are brought together and there are no raw surfaces to promote coagulation.

Of the many modifications of Crile's method the one which received most favor is that of Charles A. Elsberg, who published in the J. A. M. A. March 13, 1909, a description of a "Simple cannula for the direct transfusion of blood."

E. Libman and R. Ottenberg in the J. A. M. A. March 7, 1914, published a Practical Method for Determining the Amount of Blood Passing Over During Direct Transfusion.

Indirect methods in which the blood while being transferred comes into contact with the walls of the cannula, a receptacle, a needle or a syringe soon came into vogue.

In September, 1909, G. E. Brewer and N. B. Leggett, writing in Surgery, Gynecology, and Obstetrics, described a "Method of blood

transfusion by means of paraffin-coated glass tubes," in which the tubes extended from the vessel of the donor to the vessel of the recipient.

B. M. Bernheim, in the J. A. M. A. for April 6, 1912, described the use of a silver cannula, one-half being fitted into the artery of the donor, the other into the veins of the recipient; one cannula then fits into the other, completing the connection.

Next came methods in which the blood was withdrawn and reinjected. For the prevention of clotting most of these methods depend upon paraffin-coated receptacles.

A. R. Kimpton and J. H. Brown, in the J. A. M. A., July 12, 1913, described a method of transfusion in which the blood can be withdrawn in one room, measured, and taken to another room for injection into the recipient.

The next great advance made in solving the technical difficulties of transfusion came with the introduction of the syringe method, of which the best example is probably that of Lester J. Unger, reported in the J. A. M. A. February 13, 1915, and September 18, 1915.

In the Unger apparatus a continuous injection of salt solution is made through the contrivance so that the blood does not have time to clot in it. The syringe is kept cool by means of an ether spray, which retards clotting. There is but little danger of any infection being carried from recipient to donor.

While investigations into a means of a mechanical way of preventing clotting were being pursued, experimentors were turning their attention to the chemical side of the problem with the hope that if the blood could be kept from clotting by means of some chemical the difficulty of transfusion would be immediately solved. Most of this work was done with two chemicals—herudin and sodium citrate.

The first to develop practical results with herudin was Prof. John Abel, who published his observations on "Plasma removal with the return of corpuscles" in the Journal of Pharmacology and Experimental Therapeutics, 1913–14, 625.

The sodium-citrate method, which has the advantage that the blood may be kept for some time, even four or five days on ice, and then be injected into the recipient, was reported by three investigators almost simultaneously. The first report to appear was that of Hustin in the Journal Medicale de Bruxelles, No. XII, 1914. Very early the next year Lewisohn published his account in the Medical Record (Jan. 23, 1915), which was immediately followed by the report of the work of Richard J. Weil—"Sodium citrate in the transfusion of blood," which appeared in the J. A. M. A. January 30, 1915.

One can not deal with the subject of blood transfusion without some consideration of the question of agglutination and hemolysis of blood which are so intimately connected with it and which were responsible for so many of the accidents which occurred in former times.

It has been shown that the blood from two individuals may not mix well because of the fact that the red corpuscles of one or of each may be agglutinated by the serum of the other and that the corpuscles agglutinated in this way may be hemolized as well. It has been found that all individuals soon after birth may be grouped into four distinct classes, depending upon the agglutination power of the serum of one group to cluster the red corpuscles of the other. In about 20 per cent of agglutinations of red blood cells there occurs hemolysis or disintegration of the cells.

The group to which a blood belongs becomes fixed by the third year of life and remains constant. It is not influenced by age, disease, or transfusion of blood belonging to another group. Agglutination is an early stage of hemolysis and is always present where hemolysis takes place.

Two names are prominently associated with blood grouping—Jansky and Moss.

In 1907, in the Sbornik Klinicky of Prague, Jansky described the following four groups:

Group 1, the serum of which agglutinates the corpuscles of groups 2, 3, and 4, while the cells are not agglutinated by any serum.

Group 2, the serum of which agglutinates the corpuscles of groups 3 and 4, but not those of groups 1 and 2, while the corpuscles are agglutinated by the serum of groups 1 and 3, but not by those of groups 2 and 4.

Group 3, the serum of which agglutinates the cells of groups 2 and 4, but not those of groups 1 and 3, while the corpuscles are agglutinated by the serum of groups 1 and 2, but not by those of groups 3 and 4.

Group 4, the serum of which does not agglutinate any corpuscles, while the corpuscles are agglutinated by the serum of all the other groups.

In 1910 Moss, writing in the Bulletin of Johns Hopkins Hospital, offered the following classification:

Group 1, the serum of which does not agglutinate any corpuscles, while the corpuscles are agglutinated by the serum of groups 2, 3, and 4.

Group 2, the serum of which agglutinates the corpuscles of groups 1 and 3, while the corpuscles are agglutinated by the serum of groups 3 and 4.

Group 4, the serum of which agglutinates the corpuscles of groups 1 and 2, while the corpuscles are agglutinated by the serum of Groups 2 and 4.

Group 4, the serum of which agglutinates the corpuscles of Groups 1, 2, and 3, while the corpuscles are not agglutinated by any serum.

"Both the Jansky and Moss classifications appear in textbooks and manuals. Some authors discuss both classifications, prominence being given to the classification that presumably the author himself uses in practice. Certain books give only one classification without mentioning the other.

"In grouping persons for blood transfusion, both classifications are used, the classification of Moss being the more common, especially in France, England, and the United States.

"The use of different classifications in manuals and textbooks has caused confusion and misunderstanding in teaching.

"It is also possible for serious accidents to arise in connection with transfusion of blood through confusion of the two classifications. This is especially true in case prospective donors are grouped by different examiners or at different hospitals. During the war many individuals were tested and informed that they belonged to a certain group. Should such an individual be transfused or used as a donor without further tests and the other recipient or donor, as the case might be, be grouped according to a different classification, serious results might arise."

As further confusion and the possibility of accident may be avoided by the universal use of one classification, a special committee, composed of Ludvig Hektoen, W. J. Elsner, and Reuben Ottenberg, representing the American Association of Immunologists; C. G. Bull, J. A. Kolmer, and A. F. Coca, the Society of American Bacteriologists; and H. T. Karsner, the Association of Pathologists and Bacteriologists, in 1921 unanimously recommended, on the basis of priority, that the Jansky classification be adopted.

EDITORIAL.

ON EDUCATION FOR OUR IDLE HOURS.

Much has been written recently on the subject of education, and it has been written with a design to stimulate efficiency in one's life work.

Now, Mr. Arthur Pound, writing in a recent number of the Atlantic Monthly, suggests education for our idle hours, and his paper contains much food for thought. Mr. Pound is a resident of a large manufacturing city in the Middle West, in which automatic machinery is used to a large extent in the manufacture of automobiles.

The nature of automobile manufacture requires large outputs of identical parts, accurately machined, standardized, and interchangeable, and of all manufacturing the automobile industry is to-day the most highly automatized. The automatic machines are so designed that the worker need not know the vital steps which the mechanism takes in producing the desired result. No special skill is required to operate these machines, and the skill requirement of labor which formerly was associated with an entire industrial plant is now limited to a relatively small group of engineers and executives.

This shift of vital function from man to the machine is the key to an educational problem. "Many automatic machines can be operated as well by a child of 12 as by his parents. In fact, the tender of automatic machines reaches his or her highest economic power early in life, when nerves are steadiest. The strain involved in nursing automatic machinery is a repetition strain, complicated by clatter. The operative does the same thing over and over, amid rhythmic sounds, in an atmosphere frequently stale with oil or dust. Youth stands this better than age, because youth reacts more quickly. Whereas, in the old days, a man used to come more slowly into earning power, reach his highest pay at 30 odd, his son leaps into high pay as a hobbledehoy, reaches his economic apogee short of 25, and from 35 to 45 slides swiftly down hill. He is a better earner at 20 than his father was; but the chances are that he will be a poorer provider at 50."

"The majority of youths, male and female, who are destined to become machine operatives no longer need to be taught in school how to earn their living. If they so desire, three days after the law that

sets limits on child labor leaves them free to work at the machines, they will be earning big money—practically as much as they ever will earn. There is little to learn and the mills can teach that better and cheaper than the schools."

"The pockets of these children are full of money at an age when their fathers earned less than a living wage as apprentices. They are economically independent of home and social control. They have the eternal belief of youth that the preceding generation is fossilized and the buying power to act upon their belief. They are foot-loose to go wherever automatic machines are turning; they can buy their pleasure, and they do. Their very active minds have no background and feel the need of none. They have no conception of the cost of civilization; no standard of references by which to judge social and political questions. They have not even lived long enough to learn the simple truth that common sense and wisdom spring from the same root. With far greater need for early thrift than their elders, because their effective economic life may be shorter, they spurn the homely virtue of economy. They buy pleasures, buy companions, buy glad raiment; they try—desperately—to buy happiness. And fail. Yet they are splendid raw material for citizens. Let a cause kindle them and they rise to it like knights and ladies—*noblesse oblige*. They met every war need more than half-way; fought and fell; sacrificed and saved—during the emergency. Their faults are those of youth plus affluence."

Men and women who tend automatic machines, as a rule, leave school early, and the knowledge they have acquired in school does not help them much to earn their living, but it helps them immensely to spend their leisure.

The trend of the times is toward a shorter working day, brought about by automatic tools which increase production to such an extent that the supply may easily be made to approximate the demand.

"A shorter working day manifestly means greater leisure for the masses. Now it is everlastingly true that the bulk of human mischief is done in spare time. There is precious little chance for original sin, or any other kind of sin, to work itself out under the strict regimen of a modern factory. While human beings are at work, they are, perforce, reasonably decent; the employer sees to it that the time he buys is not wasted; but no one exercises an equal degree of control and supervision over a man's unbought time—his leisure—unless it is the man himself."

So it comes that in a town dominated by automatic machinery the education problem is to train youth for the right use of leisure. "Why waste time teaching city children how to work," the writer asks, "when their chief need is to know how to live?"

And here is the point of Mr. Pound's argument. "Education for leisure, under the conditions of automatic production, is education for life. The attendant of automatic tools does not live while he is on the job; he exists against the time when he can begin to live, which is when he leaves the shop. His task does not call for a fraction of his full powers as a sentient being or monopolize his interest. If he could buy the same amount of well-financed leisure as easily in any other way, he would shift jobs to-morrow. It is impossible for him to grow mentally through his work. So he comes to his post as a slave to the galley and leaves it with the gladness of a convict escaping prison. * * * The hours given to tending automatic machines are given to buy leisure; and in that leisure the operative lives."

Self-restraint, as we will all admit, is the first requirement for the right use of leisure, and need for self-restraint increases in direct proportion to affluence.

"Knowledge, as the chief restraining influence in the youthful mind, is the substitute that education must establish in place of the set of controls which formerly resulted from the young man's poverty or fear of poverty." Remembering that the rising generation reaches its highest economic utility early in life, and that it soon, relatively speaking, reaches the economic status of old age, we must agree that unless youth is taught thrift, pauperism and old-age pensions loom large in the future.

"Self-restraint is not all that a man needs in order to make something out of leisure. A man may be ever so self-restrained, and yet be desperately bored at the prospect of spending an hour in his own company. Self-restraint is merely the brake upon the ego motor; it will keep the individual from running amuck in society, but it will not start anything. What the ego motor needs in leisure is fuel, something upon which it can travel, progress, journey into new realms of thought. The best fuel for the purpose is compounded of interest in the present, understanding of the past, and sympathy with the future. History, literature, science, art, music—all these give life a meaning and to leisure inspiration; a reasonable concern in all that man has done, is doing, or is about to do on this planet; with such equipment any fool could use leisure right. To sow that seed is the first duty of educators, now as always, now more than ever."

It is a far cry from the tender of automatic machinery in Flint, Mich., to the medical officer and the hospital corpsman of the Navy, but can we not with propriety apply to ourselves some of the principles which pertain to the machine tender and ask ourselves the question: Are we educating ourselves for the right use of leisure?

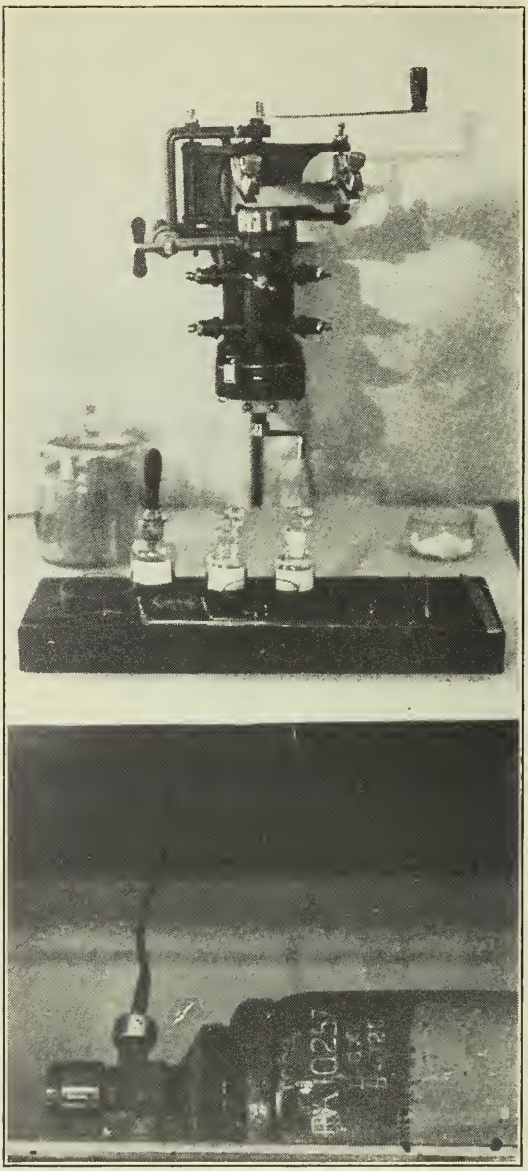
ON "LINE OF DUTY."

The Attorney General of the United States and the Judge Advocate General of the Navy have recently rendered decisions which have greatly liberalized the findings of the origin of a disease or injury to be in "the line of duty." The War Risk Insurance Act, as amended by the Sweet Bill, approved August 9, 1921, will further extend the application of "line of duty" as far as the benefits of the War Risk Insurance Act are concerned. This act permits an aggravation of a disease or of an old surgical condition which existed prior to enlistment to be considered as being a factor in adjudging questions of "line of duty," and the aggravation of such a physical defect is considered to be in line of duty unless the condition is noted and recorded at the time of enlistment. Therefore it should be the particular concern of every medical officer who is on recruiting duty to examine each applicant carefully and to note every deformity or abnormality found, and to question each candidate for enlistment particularly regarding previous diseases or injury and to record the applicant's answers.

The following case, which recently required a decision as to "line of duty," illustrates the saving to the Government of money spent for compensation and medical treatment which would have occurred had the individual been carefully examined prior to enlistment.

The individual in question enlisted October 19, 1920. He was admitted to the sick list January 9, 1921, with a diagnosis of "Otitis media, chronic. Origin: Not in line of duty. Not due to his own misconduct. The condition existed prior to enlistment." The medical officer who examined him at that time stated in the health record: "Patient has performation of both eardrums. Profuse purulent discharge from both ears. Hearing impaired in either ear. Complains of earache and deafness. Temperature, 102°. Slight tenderness over mastoid. Has had discharging ears since childhood. Examination shows both tympanic membranes thickened by old chronic, purulent process. There are small perforations in membranes on each side through which there is a chronic, purulent discharge. At present the discharge is not profuse, but there is a little present and it has varied thus since childhood."

The man was discharged from the service after 71 sick days. He had given the Government only 82 days of active service, yet, because the medical officer who examined him for enlistment did not discover the perforations in the patient's eardrums or his diminished hearing, he will, according to law, be entitled to compensation or treatment from the Government for the rest of his life.



FROZEN SECTION EQUIPMENT, SPENCER AUTOMATIC LABORATORY MICROTOME NO. 880 WITH FREEZING ATTACHMENT FOR CARBON DIOXIDE. TRAY SHOWS COMPLETE EQUIPMENT FOR THE WILSON TECHNIC.

SPECIAL DEVICES.

THE TECHNIQUE OF MAKING AND STAINING FROZEN SECTIONS.

By J. Harper, Lieutenant Commander, Medical Corps, United States Navy.

This is the most rapid method we have at hand for obtaining stained sections of tissue. An automatic laboratory microtome of the Spencer type with a carbon-dioxide freezing attachment furnishes a practical and very satisfactory method of making frozen sections. This type of microtome can also be used for paraffin or celloidin sectioning. The microtome is supported by means of a bracket above the work table and is connected by means of the freezing attachment to the carbon-dioxide tank beneath the table. Frozen sections may be made from either fresh or fixed tissue.

Fresh frozen tissue sectioning.—Invaluable as an aid in diagnosis at time of operation.

Technique of Wilson.—Freeze bits of tissue 2 by 10 by 10 millimeters in dextrine solution (dry dextrine stirred in boiling water to the consistency of maple sirup) and cut 5 to 15 microns thick. Remove sections from knife with tip of finger and allow them to thaw thereon. Unroll sections with camel's-hair brush in 1 per cent sodium-chloride solution. Stain 10 to 20 seconds in Unna's polychrome methylene blue. Wash momentarily in fresh 1 per cent sodium-chloride solution. Mount in Bruns's glucose medium (glucose 40 grams, camphorated spirit 10 cubic centimeters, glycerine 10 cubic centimeters, distilled water 140 cubic centimeters).

Terry's rapid method of ripening polychrome methylene blue.—In a clean petri dish place 0.5 gram of methylene blue, 0.5 gram of potassium bicarbonate, and dissolve in 50 cubic centimeters of distilled water. Place the petri dish, uncovered, in an incubator regulated to 37.5° C. for six days. Add water daily to make up loss by evaporation.

Note.—A section of uterus is an excellent test object. The stain is regarded as satisfactory if nuclei are sharply stained and the smooth muscle stained a sharp and beautiful purple.

Fixed frozen tissue sectioning.—Tissue should be fixed for at least 12 hours. Any fixative may be used, preferably 10 per cent formalin. Tissues fixed by alcohol or any other reagent, except formaldehyde, must be washed in running water for some hours before they can be

frozen. Even with tissue fixed in formaldehyde washing in water for 10 to 30 minutes is advisable, as better sections can be obtained.

THE NAVAL MEDICAL SCHOOL ROUTINE FOR SECTIONING AND STAINING FIXED FROZEN TISSUE.

1. Cut specimen into desired blocks 5 by 5 by 3 millimeters.
2. Fasten to freezing plate by means of dextrine solution.
3. Freeze and cut sections not more than 10 microns thick.
4. Remove section from knife blade with finger and place in distilled water.
5. Float section on slide with aid of glass rod lifter.
6. Remove excess of water by wiping close to section.
7. Flood section with absolute alcohol from dropping bottle.
8. Drop on one drop of very thin celloidin.
9. Wipe off excess of celloidin close to section.
10. Put slide in tap water three to five minutes.
11. Put slide in haemotoxylin five to seven minutes (Erlich's).
12. Wash in two tap waters; leave in last one five minutes.
13. Ninety-five per cent alcohol, two minutes.
14. Eosin (alcoholic), one-half minute.
15. Seventy per cent alcohol, two minutes.
16. Ninety-five per cent alcohol (two changes), two minutes in each.
17. Absolute alcohol, dip.
18. Xylol (three changes), leave in last one five minutes.
19. Mount in Canada balsam.

NOTE.—Sections cut and stained by this method are permanent and will last for years. Satisfactory results can be obtained with decalcified bone tissue. For Gram's, acid-fast, and silver-nitrate staining better results are obtained by using albumin in preference to celloidin in fixing section to slide.

ERLICH'S STOCK HEMATOXYLIN.

Hematoxylin	2 grams
Distilled water	100 cubic centimeters
Absolute alcohol	100 cubic centimeters
Glycerine	100 cubic centimeters
Glacial acetic acid	20 cubic centimeters

Separate with aluminum ammonium sulphate (about two handsful); ripen; this stain can be ripened in three weeks in a 56° C. incubator, using the electric light. Dilute the stock solution for use as follows: Stock solution, 20 cubic centimeters; aluminum ammonium sulphate (saturated solution), 40 cubic centimeters; and distilled water, 80 cubic centimeters.

CLINICAL NOTES.

NEUROSYPHILIS.

By H. Butts, Lieutenant Commander, Medical Corps, United States Navy, and W. M. Alberty, Lieutenant, Medical Corps, United States Navy.

A review of the literature on neurosyphilis for the past three or four years reveals some startling facts, especially as regards diagnosis and treatment. The cases here presented are designed to show some of its protean forms and the effect of treatment.

Why certain individuals develop neural involvement and others do not is, as yet, not definitely proven. The theory of a special or neurotrophic strain has been advanced, but Kraepelin and others have noted that in certain countries, as East Africa, Abyssinia, and Asia Minor, syphilis is very prevalent, but generally runs a light course, with skin involvement only, and only rarely with involvement of the nervous system. Europeans in these countries, however, readily acquire neurosyphilis, for which the nervous tissues of the natives seem to be insensitive. Speaking more particularly with reference to dementia paralytica, one of the many forms of neurosyphilis, Kraepelin is forced to the conclusion that the difference in the sensitiveness of individuals for acquiring this disease lies not in the varying virulence of the syphilitic poison, but in the nervous condition of people themselves. Fraser, of Aberdeen, advances the theory that neurosyphilis is due to overtreating during the secondary stage, and thereby destroying the necessary antibodies for the brain tissues. Under or defective treatment is doubtless a factor in many cases. Color is lent to the theory that certain strains of spirochætæ are unusually virulent for the nervous system, and in this respect seem to exercise a selective action by the occurrence of certain undoubted cases of neurosyphilis contracted from the same source. Thus Brosius (cited by Kraepelin) observed luetic infection in seven glass blowers, who became infected by using the same glass blowpipe which a syphilitic coworker had been using. Five of these seven men suffered with either certain tabes or certain dementia paralytica, while the other two men were in a high degree suspicious cases of the latter disease. All these men were immediately and thoroughly given antiluetic treatment. Nonne saw three men who became infected the same night from the same person, and one acquired tabes and two dementia paralytica. Erb saw five men who acquired either tabes or dementia paralytica from the same source.

It is stated by good syphilographers that at present neurosyphilis is on the increase. The male sex seems somewhat more frequently

infected. As to its occurrence among different races, little that is definite can be said. Earlier writers claimed almost total immunity for the colored race, but this has not been definitely proven. As to the percentage of cases showing infection of the nervous system, the statistics of various authors differ somewhat, but not to a very marked degree. Moore, of Baltimore, in an analysis of some 650 cases, is of the opinion that from 30 to 50 per cent of syphilitics show nervous involvement. Of this number some 25 per cent progress far enough to show clinical manifestations. Church states that "a careful examination of the optic and auditory nerves will find them affected in more than one-half of all cases during the secondary period of syphilis." Fordyce, of Columbia University, who is considered one of the more conservative writers, has found neurosyphilis occurring in some 20 per cent of cases examined. Carnaz, in examining a large series of cases, made a diagnosis of neurosyphilis in 30 per cent, including all stages of syphilis, primary, secondary, and tertiary, the diagnosis being made from cerebrospinal fluid examinations. As regards the incidence of neurosyphilis, the findings of numerous investigators, such as Southard, Larkin, Fraser, Neymann, and others, agree with the above.

According to the anatomical classification of Southard, the following forms of neurosyphilis exist:

1. Autonomic neurosyphilis.
2. Peripheral neurosyphilis.
3. Central neurosyphilis (meningeal, vascular, parenchymatous, meningo-vascular, meningo-vascular-parenchymatous).
4. Gumma.

According to the classification of Head and Fearnsides, the following clinical forms exist:

1. Syphilis meningo-vascularis (cerebral forms, hemiplegia, affection of the cranial nerves, muscular atrophy, lateral and combined degeneration).
2. Syphilis centralis (dementia paralytica, tabes dorsalis, muscular atrophy, gastric crises, epileptic manifestations).

As will be seen from the above classification, it is difficult to state where one form of syphilis terminates and another begins, and it is probable that in nearly all cases no single lesion exists, but rather a combination of two or more of the anatomical forms. Southard has made a simpler classification which covers practically all forms of neurosyphilis and is not so confusing. His classification is as follows:

1. Diffuse neurosyphilis, including nonvascular forms of cerebral, spinal, and cerebrospinal.
2. Vascular neurosyphilis, including cerebral arteriosclerosis and cerebral thrombosis.
3. Paretic neurosyphilis, or general paresis.
4. Tabetic neurosyphilis, including gumma of the membranes and brain.
5. Juvenile neurosyphilis of the paretic, tabetic, and diffuse types.

Among the numerous cases that come under a doubtful classification and which Southard lists as puzzles and errors, may be mentioned paresis sine paresi, syphilitic neurasthenia, tabetic psychosis, syphilitic paranoia, and syphilitic neuralgias. It is interesting to note that Ravariet, Breton, and Petite, in examining the cerebrospinal fluid of a number of cases of insanity, supposedly nonsyphilitic, found 30 to 40 per cent of positive reactions occurring in cases of epilepsy, idiocy, and imbecility.

In discussing the diagnosis it is well to remember the teachings of Osler, in which he pointed out that syphilis could simulate anything in medicine. All modern writers are agreed that in order to diminish the percentage of neurosyphilis early diagnosis and early treatment are necessary if the more serious lesions, such as tabes and paresis, which constitute about 10 per cent of the later manifestations, are to be avoided. It is needless to emphasize the importance this bears to the individual's future and to his economic and social value to himself, family, and State. It is probable that if early diagnostic methods were carried out and early treatment instituted many State institutions and private sanitariums would be spared the care of a large number of patients. All authors are agreed that infection of the nervous system occurs during the first generalization of the disease, which we understand as the early secondary stage. Generalization has begun at the time of appearance of the primary lesion, and probably before. This is demonstrated by the fact that a number of spinal fluids examined during the primary stage showed pathological findings. Moore, of Johns Hopkins, found 2.9 per cent positive spinal-fluid reactions in primary syphilis and 12 to 15 per cent during the secondary stage. It is the consensus of opinion that from 15 to 20 per cent of spinal fluids will show pathological changes during the primary and secondary stages. Definite cases of neurosyphilis have been demonstrated clinically as early as the seventh month following the primary lesion. How soon this could have been demonstrated by means of cytological and serological examinations is difficult to say. Fordyce thinks that all cases develop during the first year of infection and that the so-called latent syphilis appearing 5 to 20 years following the primary lesion is not a manifestation of infection at this period. Other authors advocate routine spinal punctures during the first course of treatment of all primary and secondary cases, this to be followed up later by other examinations.

It is agreed in the very earliest stages of the disease, or the stage of generalization, that it is in many cases impossible to diagnose neurosyphilis by the most searching neurological examination. Many cases which present a slight deviation from normal are easily overlooked in the routine examination, even though the patient present

a positive syphilitic history. To await definite pathological changes in the neurological findings means the development of degenerative changes in the nervous system and the progression of the disease to a point where therapy promises at best only a checking of the symptoms, and a definite cure is almost impossible. Scott, of the Canadian army, considers the condition of the blood as no indication of cerebrospinal syphilis, particularly if the patient has received systematic treatment and if it is one of the asymptomatic types. To be satisfied with a neurological examination for the diagnosis of neurosyphilis is almost criminal. To dispose of any case in whom the generalization has taken place merely with a negative blood Wassermann test without the examination of the spinal fluid is a gross injustice to the patient. As stated before, there are many cases in which the blood Wassermann will be negative and the spinal fluid positive or pathological in one or more of the standard tests. This condition holds true in many cases that present no subjective or objective symptoms.

As between the paretic and the diffuse nonparetic forms of neurosyphilis, Southard states that none can now successfully make a differential diagnosis between these forms in many phases of either disease, even with all laboratory refinements, and that it is improper not to give the full benefits of modern treatment in all cases in which the diagnosis remains doubtful between these two forms of neurosyphilis.

Neu, of Indianapolis, states that functional diseases of the nervous system are becoming less popular; that every abnormal function is based upon some pathology, and our failure to ascertain the cause of that pathological process is due to our lack of knowledge or ability to discover the probable cause. So in the diagnosis, or the attempted diagnosis, of neurosyphilis every possible method should be utilized.

In the diagnosis of neurospyhilis history means very little, as some 50 per cent of the cases give a negative history. As to the clinical diagnosis, we will simply mention some of the most common findings and will not attempt a classification of symptoms as based upon the various types of lesions. To attempt to name all the diseases in which a differential diagnosis is important would be impossible. One has only to remember the number of cases in which surgery has been imposed for abdominal pathology and the number of infectious conditions which may be simulated by syphilis to see the futility of the attempt. Before proceeding with a neurological examination one should not forget the general physical examination, as nervous involvement is always secondary to some focus without. Due consideration should be paid to the condition of the aorta,

glandular system, appendages, and periosteum. In connection with the neurological examination every patient should be given an ophthalmological and otological examination, and these should be repeated at frequent intervals until a definite cure is established. An optic neuritis occurs in many cases, and if untreated will result in atrophy. Involvement of the eighth nerve is a very frequent and early symptom in many cases, especially in early tabes, and has been pointed out by Schaller.

In the neurological examination of neurosyphilitics the following abnormalities have been noted:

	Per cent.
Irregularity of the pupils	70
Inequality of the pupils	35
Pin-point pupils	5
Argyll-Robertson pupils	33
Sluggishness to light	16
Ptosis	7
Nystagmus	8
Sensory disturbance of the fifth nerve	14
Impaired function of seventh, eighth, and twelfth nerves	3 to 5
Hemiplegia	4
Atrophy	4
Spasticity	5
Hypotonia	8
Incoordinated movements of upper extremities	18
Ataxic gait	9
Tremor of the extremities	7
Sensory changes	50
Absent knee jerks	29
Decreased knee jerks	9
Inequality of the knee jerks	20
Exaggerated knee jerks	12
Absent abdominal reflexes	14
Positive Romberg sign	24
Positive Babinski sign	11

The most important diagnostic procedure in cases of neurosyphilis is the examination of the spinal fluid. Southard requires six tests in all cases—namely, blood Wassermann, spinal fluid Wassermann, spinal fluid cytology, spinal fluid globulin, spinal fluid albumin, and the colloidal gold reaction. Added to these should be the spinal fluid pressure. Pressure is supposed to be the first change that occurs in case of syphilitic infection, and is increased in about 70 per cent of all cases.

The colloidal gold reaction occurs early and is of the greatest value in the differential diagnosis of the various types of nervous syphilis, showing the paretic curve in 90 to 100 per cent in general paresis. In other forms the luetic curve is shown, but with a smaller per cent of positives. Some authors consider it possible to diagnose a pre-paretic involvement from the gold chloride reaction.

The globulin is increased, according to Larkin, as follows: Parenchymatous, 90 to 100 per cent; meningo-ecephalitic, 85 per cent; meningeal, 65 to 70 per cent. In purely vascular lesions the globulin may or may not show an increase. Globulin excess is supposed to precede cellular changes and the appearance of a positive Wassermann reaction. The albumin serves as a sort of check on the globulin, running parallel with it.

Cyto diagnosis is one of the most important phases of the examination. Larkin found a pathological count in 70 per cent of cases presenting symptoms and 28 per cent of those without symptoms. The number of cells vary somewhat according to the type of lesion. Noguchi in a large series of cases tabulated the following cell counts:

General paresis	25 to 350
Tabes	25 to 200
Cerebrospinal	a few hundred to 2,000

In interpreting cell counts it will be remembered that anything below 7 is considered normal, between 7 and 10 as suspicious, and anything above 10 as definitely pathological.

The Wassermann reaction, the last of the pathological findings to appear, is probably the most valuable in the diagnosis. A positive Wassermann occurs in from 90 to 100 per cent in general paresis, 55 to 70 per cent in tabes, and some 50 per cent in cerebrospinal syphilis. It is considered that some 20 per cent of all neurosyphilitics show a negative spinal fluid Wassermann, these occurring mostly in the vascular types. No Wassermann should be reported negative unless run in dilutions as high as 2 cubic centimeters.

There are at present three main types of treatment carried out: The first is the general or systemic treatment. It is probably used more than all other methods combined. This consists of intravenous salvarsan given in weekly doses over a period of several weeks, followed by a rest before beginning another course. Several courses of treatment are usually given, and the patient receives mercury almost continually for a period of from one to three years. Shamberg has proven that more mercury may be given by inunctions than by any other method. He uses calomel ointment, but this has not proven satisfactory in the hands of others.

The second method of treatment consists in spinal punctures following each intravenous medication, the theory being that the choroid plexus is stimulated to greater activity, thereby increasing the amount of arsenic in the spinal fluid. At present this method of treatment has very few followers.

The third method is the one that is used in connection with the first, especially in those persistent cases which do not show satisfactory improvement following the unmodified intravenous method. It should be carried out in every case in which there has been a patho-

logical fluid demonstrated and which has not become normal by sufficient intravenous medication. Fordyce uses the intraspinal therapy in all persistent pathological cases; Southard advocates it under the same conditions as do many other syphologists who are treating a large number of cases. Probably the best method is the use of salvarsanized serum fortified with from one-tenth to one-half milligram of salvarsan. Mercuralized serum is used in many cases and may be alternated with the salvarsanized method or used in combination as the salvarsanized-mercurialized serum. Many have used the intraventricular method and reported excellent results. Skoog treated 12 cases by this method and obtained very satisfactory results.

The cases now to be presented were all admitted to the naval hospital, San Diego, Calif., since January 1, 1921. The variety of symptoms shown makes it difficult to believe that they belong to the same clinical entity—neurosyphilis.

Case 1.—C. W. W., C. M. M., age 34. Admitted to hospital with diagnosis undetermined April 20, 1921. He presented the appearance of a man getting over a drunken spree—eyes somewhat congested, clothing untidy, hair uncombed, breath offensive, dull mentality, memory poor, and disoriented for time. He denied alcoholic indulgence, but complained of loss of memory, no ambition, constant headache, ill-defined pains in stomach, insomnia, and the fear that he was losing his mind. He had been feeling unwell for about one week prior to admission, and during this week had vomited five or six times. He stated that he had often felt dizzy, and had a feeling of numbness in his head, not exactly headache. There were no visual disturbances, girdle feeling, lightning pains, or disturbance of locomotion. He stated that he had made one trip to the hospital prior to his regular admission without knowing what he did. Grandiose ideas, delusions or hallucinations were not elicited.

He remained in bed a few days after admission, and then began to minimize his complaints—insisted that there was nothing seriously the matter with him, that he was "just a little nervous," and was sure that he would soon get over this if permitted to remain at home a few days. For two or three days after admission his gait was peculiar; he walked slowly with feet wide apart, somewhat like a duck. He was also seen several times walking about the grounds of the hospital with his coat unbuttoned, no collar on, and clothing neither pressed nor brushed. He had noticed nothing unusual about this until his attention was called to the fact that this was rather disreputable conduct for a chief petty officer. Several individuals about the hospital observed peculiar actions and irrelevant remarks on his part at inappropriate times. On several occasions he began to cry without adequate cause.

His memory and speech were quite defective, and his handwriting was highly suggestive of general paresis. He denied venereal infection, but gave a history of six "abortions" (miscarriages?) on the part of his wife. One child, aged 6 years, is living, and said to be in good health. Two "abortions" occurred prior to the birth of this child.

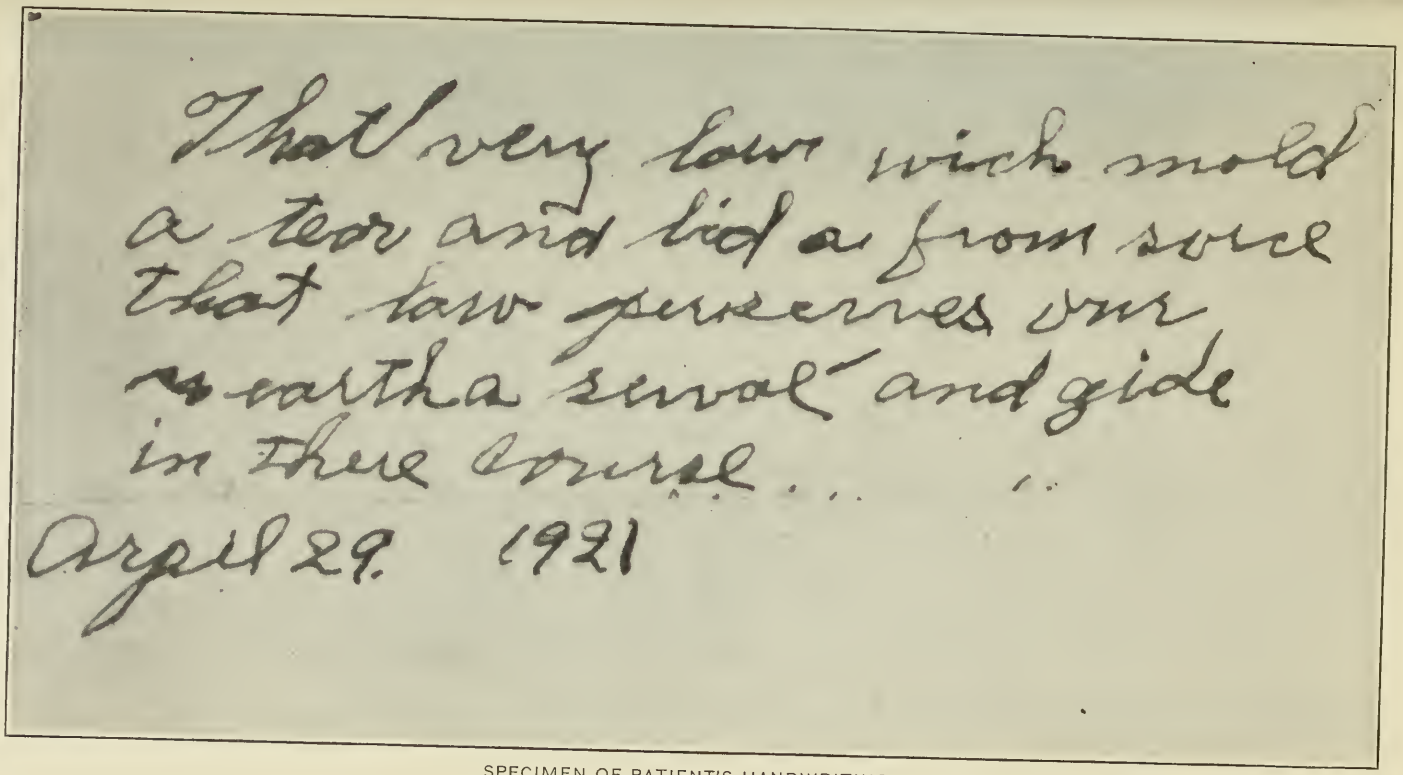
Physical examination was practically negative, with the exception of the presence of a slight degree of lymphatic enlargement.

The neurological examination showed some important deviations from normal. The left pupil was slightly irregular in outline, but both pupils were about equal in size, and both reacted sluggishly to light, but promptly to accommodation, the consensual and the sympathetic test. Eye movements were normal. The facial muscles showed no paralyses. There was a pronounced tremor of the tongue, and it was protruded in a jerky fashion like a snake. It closely simulated the "trombone tongue" of general paresis. For two or three weeks after admission he repeated test phrases very poorly, and indeed was unable to repeat some of them at all. The deep reflexes of the upper extremities were about normal, but exaggerated for the lower extremities. The superficial reflexes were active. No pathological reflexes were noted. On admission he was unusually hyperesthetic over his trunk and lower limbs—the least touch would cause him to jump, and very little pressure from a pin elicited considerable pain.

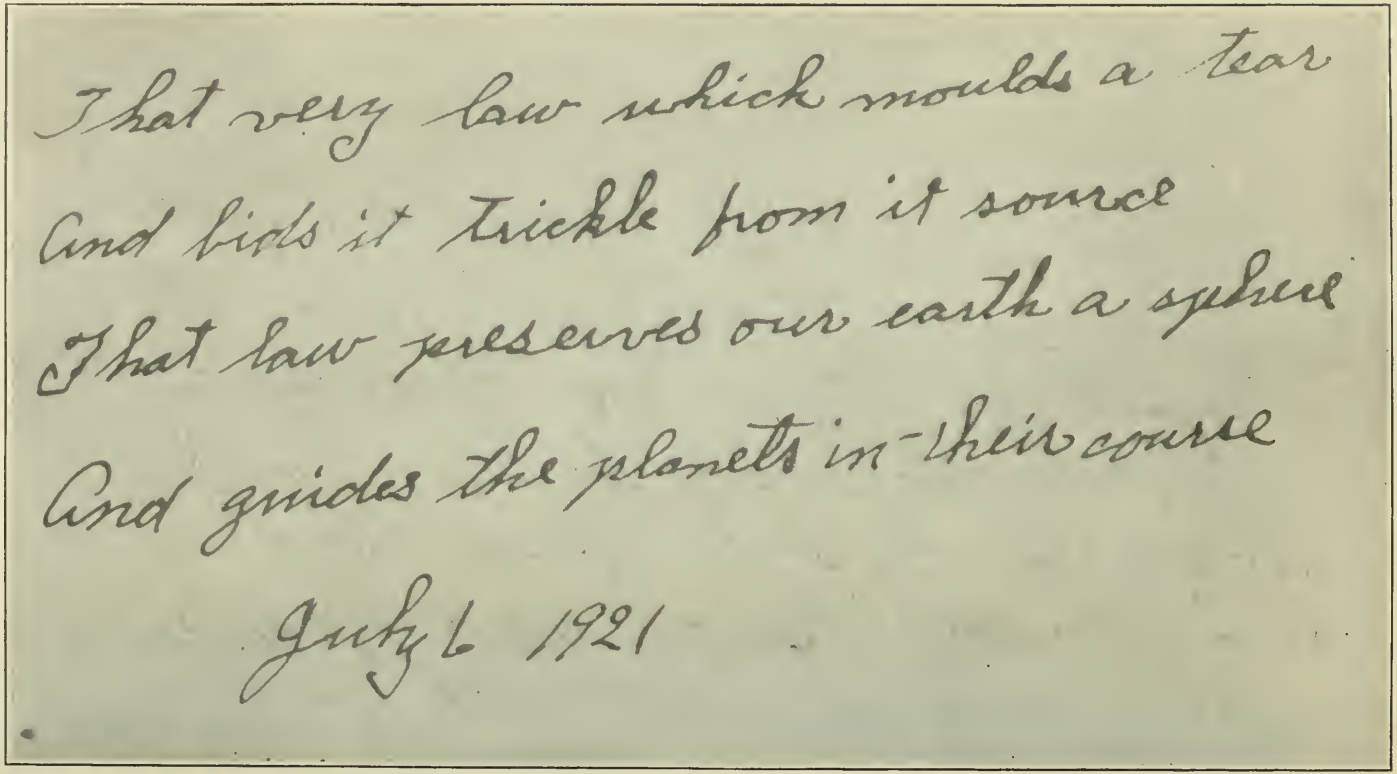
Nine days after admission the Wassermann test of his cerebrospinal fluid was found to be four plus, though blood Wassermann was negative. The spinal fluid was ejected under considerable pressure, and his cell count was 200 per cu. mm. His blood count showed red corpuscles 3,800,000 per cu. mm., white corpuscles 16,950, hemoglobin 75 per cent.

On May 4 his diagnosis was changed to syphilis, and he was placed on intensive antiluetic treatment, under which he slowly but steadily improved. He gained in weight, his hyperesthesia and headaches disappeared, his memory, his handwriting, his speech, and his appetite greatly improved. He became far more careful of his personal appearance, he slept much better, he became far more cheerful, and he again took a normal degree of interest in life. To use his own expression, he "felt like a new man."

Samples of his handwriting, one obtained three days after admission to the hospital and another on the date of his discharge to duty, July 6, 1921, are given herewith. His handwriting, it may be said, improved pari passu with his physical and mental improvement, an achievement, it is believed, rarely sought or obtained solely from medical procedures.


That very law which moldd
a tear and bid a from sorce
that law preserves our
earth a sevol and gide
in Thes Course . . . . .
Arpil 29. 1921

SPECIMEN OF PATIENT'S HANDWRITING.


That very law which moulds a tear
And bids it trickle from it source
That law preserves our earth a sphere
And guides the planets in their course
July 6 1921

SPECIMEN OF PATIENT'S HANDWRITING.

We would like to be able to report a permanent cure in this case, but, unfortunately, in spite of continued and intensive treatment while on duty, including the weekly administration of salvarsan, it was necessary to readmit him to hospital on August 8, 1921, his sole complaint being "loss of memory." He was found to be disoriented for time and place, irresponsible, and his memory was practically nil. He could not remember the name of his ship or of his commanding officer, did not remember what he had had to eat at the preceding meal, and on the day following his admission he inquired how and when he was admitted to the hospital. He was quite restless and despondent, and expressed the opinion that he was surely going to die soon or become insane. He was again very untidy in appearance, and was quite indifferent as to the fate of his family in case of his demise or commitment to an institution for the insane; he said they could "shift for themselves, as I have always done."

A neurological examination showed him to be unable to stand without much swaying from side to side while his eyes were closed. All superficial and deep reflexes were active, test phrases were fairly well pronounced, his protruded tongue showed no marked tremor, his gait was slow but otherwise normal, and his equal pupils reacted well to light and accommodations. His blood Wassermann was negative, spinal fluid Wassermann four plus, cell count 71 per cu. mm., globulin test positive, and his spinal fluid was ejected under considerable pressure.

The prognosis in his case is at best considered very uncertain for complete recovery. This case illustrates the unreliability of depending solely upon a blood Wassermann for diagnosis of neurosyphilis.

Case 2.—W. B. C., painter, 3d class, age 29. Admitted to hospital January 2, 1921, with diagnosis undetermined. Complaint, general weakness and pain on moving his legs. He was very apathetic. He would lie in bed on his back without moving, his eyeballs generally rolled upward, and mouth kept wide open most of the time. He complained of severe pains in his legs when moved by hospital corpsmen. He was apparently unable to completely close his eyelids, to whistle, blow out his lips, or wrinkle his forehead. He would lie for hours and allow saliva to accumulate in his mouth and throat, making no effort to evacuate until his mouth was entirely filled, and would then soil the bed linen and himself in the effort to do so. He took absolutely no interest in his surroundings, would mutter inarticulate sounds to himself, and was somewhat negativistic. Though approximately oriented, his memory showed defect, and on account of his noncooperation it was impossible to obtain any reliable history from him for a considerable period after admission to hos-

pital. Delusions or hallucinations were at no time elicited. On several occasions he refused to eat and would talk to himself. These and certain other peculiarities of conduct were observed by a number of persons in his ward.

Neurological examination showed partial paralysis of facial muscles, cutaneous sensibility intact but not very acute, pupils equal in size and outline, and responded to light and accommodation. The deep reflexes of upper extremities were sluggish. The knee jerks and tendon Achilles reflexes were apparently absent.

On January 7 he began to run an afternoon rise of temperature of 102° to 103° F., the paralysis of his facial muscles became more marked, and he had difficulty in swallowing. The salivary secretion continued to be excessive, and examination of his lungs showed a few bubbling râles, probably the result of inspiring salivary collections from throat and mouth. He was able to protrude his tongue easily. His speech showed marked disturbances. He was unable to approximate his lips sufficiently to pronounce the letters "P" and "B." Urinary incontinence and involuntary bowel passages also developed and muscular weakness of both upper and lower extremities became quite noticeable. His eyeballs were not almost constantly rolled upward.

On January 12, his blood Wassermann was found to be four plus, his spinal fluid Wassermann one plus. He was at once put on intensive antiluetic treatment, and within a week his condition began to show slight but certain improvement. He began to have better use of his arm, he could close his right eye, and he could more nearly approximate his lips. On February 27 he had improved to such an extent that he was up and about on crutches, and he was gaining steadily in weight and strength. On March 24 all symptoms had disappeared except muscular weakness, and on May 11, having completed two courses of salvarsan of six doses each, supplemented by intensive mercurial medication, he was restored to duty, and, so far as known, has had no return of symptoms.

Comment: The value of Wassermann tests of blood serum and spinal fluid was very evident in this case in making a differential diagnosis and indicating the proper course of treatment. Prior to the making of these tests the case might have been mistaken for either dementia praecox of the catatonic type or bulbar paralysis, as symptoms of both diseases were present.

Case 3.—D. J. S., ph. mate, 3d class, age 21. Admitted to hospital April 17; diagnosis, transverse myelitis. Complaint, paralysis from waist down. His family history was negative. His personal history was negative except for an attack of "chancroid" about three years ago.

History of present illness: Patient awakened about 1 a. m., April 7, with a severe pain in a lumbar region. His temperature was

normal. He was given one-sixth grain of morphine sulphate, following which he went to sleep again. The following morning he had some numbness and tingling of both legs, and his temperature had ascended to 100.5° F. His legs gradually became weaker, and by noon he was unable to use them. He also had urinary retention at this time, requiring catheterization, and his bowels could be moved only by taking an enema. There was no history of dribbling, incontinence, or loss of sphincter control.

Physical examination: Well nourished. Heart and lungs negative. Cervical glands not enlarged, left epitrochlear enlarged, and right epitrochlear palpable. Inguinal glands were only slightly enlarged.

Neurological examination: Pupils were equal in size, regular in outline, and reacted promptly to light and accommodation. There was no paralysis of eye muscles. The corneal and pharyngeal reflexes were present. The jaw reflex was present. The deep reflexes of upper extremities were equal and active. The epigastric and abdominal reflexes were present, the latter somewhat sluggish. The cremasteric reflex was absent. The knee jerks and Achilles tendon reflexes were absent. No pathological reflex was demonstrated. There was no ankle or knee clonus. His sensations to touch, pain, and temperature were present, but very much decreased in degree of acuteness for lower half of body. His muscles reacted to stimuli. Temperature, pulse, and respiration were normal.

On April 11 a spinal puncture was done, the fluid withdrawn being clear but ejected under considerable pressure. The cell count of his spinal fluid was 5 per cu. mm., the globulin test was negative, and the Wassermann test four plus. The Wassermann test of his blood serum was also four plus.

The diagnosis was at once changed to syphilis, and he was given intensive antiluetic treatment, under which he soon began to show a slight degree of improvement. He began to have more feeling in his legs, and could flex and extend his toes, but the involuntary passage of urine and feces continued, though these conditions have also markedly improved. In May large and deep bedsores developed over sacrum. These have since markedly improved. Since June 13 he has been up and about daily in a wheel chair; he is gaining in weight and strength, and he is able to move both legs freely. Within a very few days it is believed that he will be able to walk with crutches. The prognosis for ultimate complete recovery is considered good.

Case 4.—J. P., civilian (formerly of Coast Guard Service), age 35. Complaint, dizziness. His family and past history were negative. He stated that he began to feel dizzy two days prior to admission to this hospital, and that it caused him to stagger as he walked. He also complained that his head felt sore, but he did not have actual head-

ache. He presented the appearance of a man at least 20 years older than his real age.

His general physical examination was negative. Neurological examination showed marked nystagmus on looking to the right. His eye grounds were normal, and otological examination was negative. Neurological examination was otherwise negative. His blood Wassermann was one plus in three antigens, and spinal fluid Wassermann was two plus in three antigens; cell count, 3. The spinal fluid pressure was greatly increased.

He was given six dozes of salvarsan in conjunction with mercurial inunctions and iodides. His symptoms disappeared, and, at his request, he was discharged from hospital. A check on his spinal fluid was not obtained.

This case illustrates one of the asymptomatic types of neurosyphilis which are somewhat difficult to classify, but is probably vascular in type. Church states that, "owing to their exposed position at the base, where specific cerebral invasion is most common, the cranial nerves are very commonly implicated. The relative frequency with which they are affected diminishes from the chiasm and optic nerves backward toward the bulb. The order is as follows: Optic nerves, motoroculi, abducens, trifacial, facial, auditory, and only rarely the glossopharyngeal, vagus, and hypoglossus."

Case 5.—Civilian employee, age 28. Complaint, vomiting and pain in abdomen. His family and past history was negative. He stated that he had been vomiting for three days prior to admission to hospital. The vomiting was combined with severe cramps in abdomen. He gave a history of intervals of epigastric pains ever since 1914, growing more severe with each attack. Careful questioning failed to elicit any other symptoms.

Physical examination was practically negative, except for a considerable degree of general adenopathy. Neurological examination showed his pupils to be irregular in outline, and they reacted sluggishly to light. The deep reflexes of the upper and lower extremities were markedly exaggerated. No pathological reflexes were noted. Neurological examination was otherwise negative. A mental examination was not made.

Laboratory findings: Blood Wassermann was three plus. The spinal fluid Wassermann was four plus, cell count 10 per c. mm., globulin positive. The spinal fluid was ejected under great pressure.

This is probably one of the preataxic gastric crises cases due to vascular involvement. The patient refused to remain in hospital for treatment and was discharged at his own request. Since his discharge from hospital it has been learned that he is also a narcotic-drug addict.

Case 6.—W. H. B., special mechanic, first class, age 34. Complaint, "unconsciousness." He gave a history of having had a chancre in November, 1920, following which he received 12 doses of salvarsan and numerous injections of mercury. His family history is negative.

History of present illness: For two days prior to his attack of "unconsciousness" he suffered with a slight headache. While working he suddenly became unconscious. This was accompanied by convulsive movements of extremities and frothing at his mouth; duration two hours. His medical officer described the attack as one simulating epilepsy of the grand mal type. He had no other symptoms.

Physical examination was entirely negative. Neurological examination showed his pupils to be slightly irregular in outline, but they reacted promptly to light and accommodation. The deep reflexes of his upper and lower extremities were somewhat sluggish. The left knee jerk was somewhat more active than the right. The cremasteric reflex was absent on the right side and sluggish on the left. No pathological reflexes were noted. The neurological findings were otherwise negative.

His blood Wassermann was negative. The spinal fluid was ejected under slight pressure, and its Wassermann test was one plus, cell count 16 cells per c. mm., globulin test negative.

This case illustrates the fallacy of depending on the blood Wassermann in cases of infection of the nervous system and emphasizes the fact that each case should have a spinal fluid Wassermann before discontinuing treatment, regardless of the blood serology. This patient is still undergoing treatment in this hospital and is improving.

Case 7.—D. I. L., engineman, first class, age 26. Complaint, "fainting spells." He stated that he had had a primary lesions of syphilis in 1918, following which he received four doses of salvarsan and five injections of mercury. His Wassermann became negative and his treatment was discontinued for two and one-half years, at the end of which time his blood showed a four plus Wassermann reaction. He was then given five doses of salvarsan and a few injections of mercury, after which his Wassermann again became negative, and all treatment was discontinued. His family history was negative.

History of present illness: Recently he had two seizures of unconsciousness. During the last one he fell on the floor, sustaining a superficial head injury, for which he was transferred to hospital, and from which he made an uneventful recovery.

His general physical examination was negative. Neurological examination showed slight tremor of tongue and extended fingers. The deep reflexes were slightly exaggerated. Neurological examination was otherwise negative. A mental examination was not made.

His spinal fluid was ejected under considerable pressure, and its Wassermann test was found to be four plus, cell count 17 per c. mm., globulin test positive. His blood Wassermann test was negative.

This case represents one of the epileptiform manifestations of neurosyphilis, probably vascular. The history also emphasizes the necessity of keeping a closer check on the condition of the spinal fluid of neurosyphilitics and not discontinuing treatment as soon as the blood Wassermann becomes negative.

Case 8.—A. B., chief yeoman, age 38. Admitted to hospital January 17, 1921, with the diagnosis of syphilis. On admission this patient was quite euphoric, and stated that he was a spiritualistic medium of great power, that he "knew everything," and that he had made $10,000 in two days "doing medium work." Physical and neurological examinations showed him to be a well-built, well-nourished man. His pupils were unequal, widely dilated, irregular in outline, and reacted to accommodation but not to either direct or consensual light. His deep reflexes were all quite active, and Romberg's symptom was present. The grip of his large hands was unequal and weak. He had the typical writing, speech, and the jerky, "trombone tongue" of paresis. Wassermann tests of his blood and spinal fluid were both positive, four plus. He was placed in an isolation ward, but could not be induced to keep any clothing on his body, except a blanket which he draped about his shoulders.

His diagnosis was changed to dementia paralytica on the day of his admission to hospital, and four days later he was transferred to the naval hospital at Mare Island, Calif., where, not content with making a few paltry thousands of dollars daily "doing medium work," he proclaimed himself to be God Almighty. In mighty, thunderous tones he would command others to do his wishes, lay curses on them, and he soon became very violent and unmanageable. He was next transferred to the Napa State Hospital, Calif., where, under date of July 28, 1921, we have been informed by the medical superintendent of that institution that "this case is undoubtedly one of dementia paralytica, and he is gradually failing both physically and mentally. I should not be at all surprised were he to pass away within a comparatively short time, as the decline in his mental condition has been steady ever since his admission to this hospital last January."

Our series of cases is fittingly closed with the above case of general paresis, an end result and the last chapter in the drama of syphilis, and for which, in our belief, no hope of cure or any considerable degree of permanent improvement can be offered. To one who has done any considerable number of post mortems on cases dying of general paresis and seen the extensive and gross pathological changes in the brain tissues—the worm-eaten appearance of

the atrophied brain after the thickened, milky looking, and adherent pia matter has been removed bit by bit, the ependymal granulations, the sclerosed and tortuous brain blood vessels, to say nothing of the destructive microscopic changes—it is unthinkable that antiluetic therapy can be of any lasting benefit. It is too late. The damage has been done. We believe that the same remarks apply in cases of posterior spinal sclerosis, another end result of syphilis, which differs only in degree and location, but not in kind, from general paresis.

However, it has been demonstrated that a clinical diagnosis of paresis is no definite contraindication to treatment, as there have been many clinical cases of paresis that have shown marked improvement under treatment, this probably being due to the simulation of the classical symptoms of paresis by meningeal and vascular types.

According to most authorities a period of three years, during which the blood and spinal fluid findings remain negative, is a minimum time in which to pronounce a cure.

The following conclusions are drawn:

1. Involvement of the nervous system occurs at an early period of the disease.

2. Early diagnosis and treatment are necessary to prevent later and more serious complications, such as paresis and tabes dorsalis.

3. Spinal puncture should be made routine in every case of syphilis as early as the diagnosis is made, regardless of stages, and certainly before discharging the patient as cured.

4. Many cases remain undiagnosed because of repeated negative blood Wassermanns, and in whom no examination of the spinal fluid has been made.

5. No persistent case should be discharged from treatment until the intraspinal or intraventricular therapy has been instituted and strenuously administered.

TREATMENT OF SURGICAL ULCERS OF STOMACH AND DUODENUM.

By J. J. A. McMullin, Lieutenant Commander, Medical Corps, United States Navy.

The treatment of gastric and duodenal ulcer is both medical and surgical. Ultraconservative internists who discredit the value of surgical treatment are just as far from the truth as ultraradical surgeons who contend that all such cases are surgical. Generally speaking, it can be said that acute ulcers may heal spontaneously and are otherwise amenable to medical treatment, and that chronic ulcers require surgical treatment. All surgeons probably have had an opportunity to permanently cure chronic calloused ulcers which were "cured" many times before by means of dieting and drugs. In the

absence of urgent contraindications it is always best to treat the patient medically, preferably by the Sippy method, and if symptoms recur after this treatment operation should be advised. Along with medical treatment points of focal infection should be sought for and removed. The general principles of the treatment of peptic ulcer are essentially the same as the treatment of an ulcer on the leg or elsewhere; the cause should be removed, irritation prevented, and the part rested. The treatment of each individual case resolves itself into a matter of selection of the best method of applying these general principles.

During the past 13 months we have treated surgically eight cases of ulcer of the duodenum, two cases of ulcer of the stomach, and one case of gastric erosions. Two of these ulcers were operated upon for acute perforation. The diagnosis of the perforated cases was based upon the history and the clinical signs and symptoms; the other ulcers were diagnosed by the history, symptoms, and X-ray. The importance of a careful, thorough, accurate history can not be overemphasized. In every instance in which the fluoroscopic study and roentgenograms have indicated ulcer we have invariably found ulcer at operation. Likewise, in every instance where the history and symptoms strongly suggested ulcer, but the tentative diagnosis was unsupported by the roentgenoscope and roentgenograms, we have found upon opening the abdomen that the symptoms were due to chronic cholecystitis, chronic appendicitis, or to no ascertainable surgical condition. About 80 per cent of cases can be diagnosed from the history. Only about 15 per cent of the patients whose outstanding complaint was referable to the stomach were finally proved to have ulcer. In one case the patient presented no gastric symptoms except pain and hematemesis. The bleeding in this case was due to gastric erosions, and there has been no recurrence of this symptom since operation, which was performed in July, 1920. In the two cases of acute perforation the value of posterior gastroenterostomy in these emergencies is emphasized. In one of these cases the perforation was in the lesser curvature of the stomach, the other in the duodenum. In the former case the ulcer was excised and the opening closed with a double row of Lembert sutures, followed by gastroenterostomy. Following perforation it has been shown that gastric peristalsis is temporarily arrested and that death frequently ensues from acute dilatation of the stomach. Gastroenterostomy in such cases is not merely a desirable adjunct; it is an imperatively necessary part of the surgical treatment and should be omitted only when the patient's condition is hopelessly bad. We should not forget that operation, per se, does not always cure ulcer.

The period of time which has elapsed since operation is too short to say that posterior gastroenterostomy has cured all the ulcers in

this series. However, these patients, with one exception, have obtained complete symptomatic relief, have gained weight, and are apparently permanently cured.

The duodenal ulcers varied from the size of a dime to the size of a quarter, and were found within 2 inches below the pyloric vein. Stimson's sign was invariably present. This sign is elicited by lightly sponging the serosa over the site of the ulcer, causing capillary hemorrhage in the cicatricial tissue. Serous stippling is observed.

The ulcers in this series were evident to sight and touch, so that the presence of this sign was only corroborative evidence. However, our experience proves that this phenomenon has genuine diagnostic value and might be a determining factor in a doubtful case. One of these patients had duodenal ulcer and chronic cholecystitis, one both gastric and duodenal ulcers, one duodenal ulcer and cholelithiasis, two duodenal ulcer and chronic appendicitis, two of the patients had previously been operated upon for chronic appendicitis without relief. Two of the 10 cases gave a history of syphilis, but had negative blood at the time of the operation. The gastric ulcers were treated by excision and gastrojejunostomy, the duodenal ulcers by gastrojejunostomy. Our operative mortality is zero.

We recently saw a patient with acute perforation of a duodenal ulcer four days after perforation. He refused operation. This patient had been treated medically for chronic gastritis for two years while in the Army and in civil life. He died the afternoon following admission. The autopsy showed perforation of a duodenal ulcer one-half inch below the pyloris. The ulcer measured one-third inch in diameter. There was no "kissing ulcer" on the opposite wall of the duodenum. There was general suppurative peritonitis. The appendix was acutely inflamed. If one had diagnosed acute appendicitis he might have found the appendix inflamed, as it was in this case, and left the operating room believing he had discovered the cause of the peritonitis. The appendix, while almost gangrenous in appearance, was not swollen, contained no pus, and was inflamed from without inward. The inflamed appendix was therefore secondary to the suppurative peritonitis, the caecum and appendix lying in a pool of pus in the right illiac fossa.

The following is an abbreviated summary of the cases treated surgically. This covers a period of 13 months:

Case I.—G. F. C., beneficiary; age, 35 years. Admitted to this hospital July 15, 1920. Discharged August 9, 1920. This man had "stomach trouble" for about two years. He complained of pain a short time after eating, especially aggravated by meats, greases, and apples. At times he vomited blood. Had several such attacks in the ward, vomiting 7 or 8 ounces of fresh blood. Often passed tarry stools. Bowels regular. History otherwise negative, except

that patient has epilepsy. Physical examination entirely negative. R. B. C. 4,000,000; Hb., 80 per cent. No X-ray examination was made in this case. As the patient was growing weak from hematemesis, we decided to operate without further delay.

Operation (ether): High right rectus incision. Stomach entirely negative for any lesion. Duodenum, gall bladder, liver, and spleen also negative. Since the patient was troubled to such an extent with hematemesis and since posterior gastroenterostomy is said to relieve this symptom in 40 per cent of cases, a posterior gastroenterostomy was performed. Chromic gut used for both layers. Wound closed in layers.

Although we discovered no lesion in this case we departed from our general practice and from modern orthodox teachings by performing a posterior gastroenterostomy. Our judgment in this instance was justified by complete relief from gastric pain and hematemesis. If there be such a lesion as gastric erosions, we believe that such a diagnosis would fit this case. This patient was relieved of epileptic attacks for seven months following his operation, but his attacks are just as frequent now as ever.

Case II.—W., H., ensign; age, 39 years. Admitted August 5, 1920. Discharged December 15, 1920.

The patient gave a history of several attacks of gallstone colic and belching of gas during past two years. His present illness started on the evening before admission with severe pain in the epigastric region, which did not radiate. He vomited several times. The pain was aggravated by deep breathing. Physical examination showed breathing and the breath sounds markedly reduced on right side; abdomen was rigid on left side; marked tenderness existed in the region of the gall bladder.

Operation (ether): On opening the abdomen the omentum was found to be thickened and congested and there was light-brown fluid in the abdomen. The appendix was negative, but the gall bladder was distended with small stones yet was not inflamed. There was found a perforating duodenal ulcer on the right anterior surface of the duodenum. Around the area was evidence of widespread peritonitis; the omentum was sealed over perforation; lymph and fibrin were everywhere around pylorus and undersurface of liver; the stomach presented a dirty reddish color from inflammation. The omentum was sutured more closely over the perforation and a posterior gastroenterostomy was performed. A drain was carried down to the seat of perforation. Drainage tube was removed the following morning.

Result: The patient was up and about in three weeks, but later he was troubled with indigestion, pain over gall bladder, and

jaundice. The gall bladder, containing over 700 stones, was removed, and the patient is now free of symptoms and is performing active duty.

Case III.—J. D. H., F-1, U. S. N., age 24 years. Admitted October 28, 1920. Discharged December 31, 1920.

This patient was admitted with a rigid abdomen and intense pain on motion or pressure. He had never had indigestion and could eat anything. For the past five weeks had pain in stomach. On the evening before admission a Hospital Corps man gave him some magnesium sulphate, and repeated this dose on the evening of admission. While walking through the navy yard he was suddenly seized with agonizing abdominal pain, dropped in his tracks, and could not move. He was carried to the hospital, where acute perforation of the stomach was diagnosed.

Operation (ether): High right rectus incision. Perforated ulcer was found on lesser curvature. Liquid stomach contents in abdominal cavity. Ulcer excised, edges cauterized and closed with a double row of Lembert sutures. Posterior gastroenterostomy performed.

Result: This patient after several uncertain days did well and left the hospital on leave of absence free of symptoms. While home he ate too much heavy food, which caused him to vomit. He fell into the hands of a surgeon, who operated upon him apparently without much forethought or study. He returned to us complaining of pain and vomiting, but after several weeks of dieting he straightened out and was restored to duty. We have been unable to learn what the procedure was at the second operation. Fluoroscopic and X-ray study before discharge showed meal passing freely through the stoma; nothing was seen to pass through the pylorus. We surmise the second operation consisted in blocking off the pylorus.

Case IV.—H. A. D., supernumerary, age 27 years. Admitted October 25, 1920. Discharged January 18, 1921. This patient was troubled with epigastric pain and vomiting since October, 1918. Symptoms came on one to two hours after meals; has never vomited blood; food relieved pain; chronically constipated; no special food aggravated condition; belched large quantities of gas; lost 15 pounds in past two years.

Physical examination was entirely negative. X-ray showed a constant distortion of duodenal cap; also a projection of the barium meal on the lesser curvature above the incisural notch. Diagnosis: Duodenal ulcer and perforating gastric ulcer.

Operation (ether) January 19, 1921: High right rectus incision. The duodenum showed an ulcer on the posterior wall of the stomach

and a large perforating ulcer on the lesser curvature just above the incisural notch. The ulcer on the lesser curvature was excised, closed with chromic gut, and buried with silk. Posterior gastroenterostomy performed. No. 1 chromic gut was used for both lines of sutures; the abdominal wound was closed in layers; clips were used for the skin.

Result: This patient gained in weight and to date, nine months following operation, is entirely free of symptoms.

Case V.—E. M., C. M. M., U. S. N., age 35 years. Admitted July 15, 1920. Discharged August 9, 1920.

The patient was first troubled two years ago with pain in the epigastrium one hour before and two hours after eating; vomiting relieved pain; greasy food disagreed most, also cabbage and tomatoes. Sodium bicarbonate relieved pain. Symptoms were intermittent, having at times periods of remission for several weeks. The patient gave a history of syphilis. Wassermann was negative. Fluoroscopic examination showed a very large stomach; duodenal cap showed generalized distortion. Unable to get cap fully filled out. Diagnosis, duodenal ulcer.

Operation (ether): High right rectus incision, cutting muscle, diagonally. The stomach, gall-bladder, and appendix were found to be normal. Large calloused duodenal ulcer was found 1½ inches below the pylorus. Posterior gastroenterostomy performed. Chromic gut used for both lines of sutures.

Result: Patient operated upon 13 months ago and has been entirely free of symptoms since.

Case VI.—C. L. B., C. G. M., U. S. N., age 34. Admitted November 23, 1920. Discharged March 3, 1921.

This patient complained of "stomach trouble" since 1913 and was operated upon for appendicitis in January, 1920. He never found that food made him any better. Has been very constipated. Complains of dull pain in epigastrium two hours after meals. Gave history of passing a quantity of dark blood in stool on two occasions. Fluoroscopic and radiographic examination shows a duodenal ulcer on upper part of cap, which had apparently perforated for about 2 mm.

Operation (ether): Upper right rectus incision ¾ inch from the midline. Stomach negative. A duodenal ulcer the size of a quarter was found 1 inch below the pylorus on the posterior wall. The gall bladder showed chronic cholecystitis; the liver showed chronic hepatitis; the glands along duct enlarged. Gastroenterostomy was performed, using No. 1 chromic gut for both layers. Cholecystectomy from below upward was done, using a Penrose drain to the stump of the cystic duct.

Result: This patient has no stomach symptoms, except occasional attacks of vomiting, usually following dietary indiscretions. He is troubled with headache, constipation, and is very nervous. He, however, looks well, has no abdominal pain, and is well nourished.

Case VII.—P. J. H., supernumerary, age 28 years. Admitted November 15, 1920. Discharged March 3, 1921.

This patient was troubled with "indigestion" in June, 1919. He complained of discomfort immediately after eating, manifested principally by gaseous and watery eructations. He was also troubled with pain in the stomach, and sometimes vomiting, two or three hours after eating. At times sodium bicarbonate relieved the pain. Physical examination was negative, except that patient was poorly nourished and had some tenderness in epigastrium. Gastric analysis showed total acidity 47°, free HCL 26°, combined HCL 9°, acid salts 2°. Wassermann negative. Hemoglobin 70 per cent. W. B. C., 8,000 to 13,000. Fluoroscopic examination showed stomach empty at end of five hours; head of barium meal had reached sigmoid; slight deformity in upper part of duodenal cap. Apparently perforating duodenal ulcer.

Operation (ether): An indurated ulcer about the size of a dime was found on the anterior surface of the duodenum 1 inch below the pylorus. Stimson's sign was present. Gall bladder and appendix normal. Posterior gastroenterostomy done; chromic gut used for both layers.

Result: Patient gained in weight since operation six months ago and has been entirely free of symptoms.

Case VIII.—W. G., W. T., U. S. N., age 30 years. Admitted January 1, 1921. Discharged February 17, 1921.

Had "stomach trouble" for the past six years, which manifested itself by pain in the epigastrium, and at times vomiting one hour after meals. Has vomited blood and has passed blood in stools. Had appendix removed six years ago. Gastric analysis showed total acidity 79°, free HCL 66°, combined HCL 8°. Fluoroscopic examination showed a rather large stomach which was bisected at times by three or four waves of peristalsis. The duodenal cap gave appearance of slight deformity. Plates corroborated deformity of cap. Diagnosis, duodenal ulcer.

Operation (ether): High right rectus incision. Stomach and gall bladder normal. Appendix absent. Large duodenal ulcer found about 2 inches below the pylorus. Gastroenterostomy performed. Chromic gut for both layers of sutures; mesocolon stitched to stomach before anastomosis was made.

Result: Six months following operation the patient is entirely free of symptoms.

Case IX.—E. J. J., supernumerary, age 32. Admitted February 7, 1921. Discharged May 17, 1921.

Chief complaint was feeling of lump in epigastric region, belching gas, and pain in epigastrium. These symptoms came on about one-half hour after meals; he is also troubled with epigastric pain, and sometimes vomiting three or four hours after meals. Food or sodium bicarbonate do not give any relief.

Physical examination was entirely negative except for tender spot about 1½ inches below sternum. Wassermann reaction was negative. Feces showed a small amount of occult blood. The result of fractional gastric analysis, specimen taken every 10 minutes, was as follows:

	First.	Second.	Third.	Fourth.	Fifth.
Total acidity	33	58	28	26	25
Free HCL	24	25	14	17	9
Combined HCL	9	30	14	19	12
Acid salts	0	0	0	0	4
Organic acid	0	0	0	0	4

Operation (ether): High right rectus incision. Small ulcer on anterior wall of duodenum. Scarring and Stimson's sign present. Gall bladder and appendix normal. Posterior gastroenterostomy performed. Chromic gut used for both layers. Closure in layers in usual manner.

Result: This patient was troubled with vomiting after eating for about one month following operation. Since then he has been free of symptoms and is at present feeling better than he has for several years and is gaining weight. It is important to be careful of the diet in all postoperative ulcers. If vomiting occurs, the patient should be given liquid diet and sodium bicarbonate a few days. He should gradually and carefully be brought back to a normal diet, being careful not to overload the stomach and to eschew foods not easily digested. The after treatment of these cases is quite as important as the operation.

Case X.—J. P., C. W. T., U. S. N., age 30 years. Admitted March 14, 1921. Discharged July 25, 1921.

Since December, 1917, the patient has been troubled with gastric fullness and belching shortly after meals and pain in the stomach for hours after eating. The pain was relieved by vomiting and by taking food. Appetite was poor. Patient vomited four to five times per week. Vomited blood twice. Troubled with headache and is very nervous. Has lost about 11 pounds in past year.

Physical examination was negative save for slight tenderness in epigastrium. Fractional gastric analysis showed constantly higher acidity (average total acidity 108; free HCl 88. String test negative, in that the end of the string remained in the stomach all night and did not pass through the pyloric orifice. X-ray and fluroscopic examination showed distortion of duodenal cap, a niche which was constant and could not be pressed out.

This patient received Sippy treatment in this hospital for several weeks without the slightest relief.

Operation (ether): High right rectus incision. Ulcer of duodenum found adherent to the head of the pancreas. Gall bladder was normal. The appendix was diseased, bound down, and filled with concretions. The appendix was removed; stump buried. Posterior gastroenterostomy was performed; rent in mesocolon sutured to stomach; closed in layers.

Result: Entirely free of symptoms since operation.

Case XI.—Z. S., supernumerary. Admitted June 8, 1921.

This patient's chief complaint was abdominal pain for the past three years. History unsatisfactory because of his lack of understanding and inability to speak English. However, it was brought out that he was troubled with "heartburn" and belching of gas shortly after taking food and at times "cramp-like" pains two or three hours later. He did not vomit. Physical examination was negative, except that there was general abdominal tenderness; no rigidity; no masses palpable. Heart sounds were weak. There was enlargement of superficial lymphatics. Wassermann was negative; sputum and urine also negative. Gastric analysis:

	First hour.	Second hour.
Total acidity	21	72
Free HCL	15	53
Acid Salts	3	18
Organic acid	3	1

June 13, 1921, fluorscopic examination showed a distortion of the duodenal cap which could not be ironed out. X-ray plates supported the fluorscopic finding.

Operation (ether), June 23, 1921:

High right rectus incision, running diagonally to the umbilicus, 4 inches long. A duodenal ulcer was found on the interior wall of the duodenum just below the pyloric vein. The ulcer was small, but could be palpated, and scarring and stippling could be seen on the overlying serosa. The gall bladder was normal. The appendix

was chronically inflamed and contained three concretions. The appendix was removed. Posterior gastroenterostomy was performed. Rent in the mesocolon sutured to stomach. Closed in layers without drainage.

Result: Six weeks following operation patient has been relieved of stomach symptoms, but is still weak. He has a hearty appetite, does not have "heartburn," and does not belch gas or vomit. His present medical attendant believes he has myocardial degeneration.

The anastomoses in this series were invariably made with the jejunum running from right to left. Absorbable suture material (No. 1 or No. 0 chromic catgut) was used for both layers of the anastomosis. Redundant mucous membrane was not trimmed, but sutured in such a way as to completely cover the inner side of the anastomosis. Breaches in the mucous membrane are favorite sites for the formation of gastrojejunal ulcers. The stomach and bowel were united by a continuous Lembert suture. The edges of the stomach and jejunal openings were sutured with a continuous Lembert suture or a lock stitch, the corner being sutured so that the needle goes from within outward and without inward and the knot tied inside. The anterior serosal suture is made with the Cushing right-angled stitch.

The after treatment of these cases was as follows:

1. Tap water (1,000 cc.) by rectum, after patient is returned to bed.
2. Fowler's position after patient reacts from anasthesia. During the next 24 hours as much tap water is given by proctoclysis as will be retained, this usually amounting to 8 to 10 pints.
3. Water, 20 cc. every 20 minutes when patient reacts from anesthesia if he complains of thirst and is not vomiting.
4. Morphine, $\frac{1}{4}$ or $\frac{1}{8}$ grain to control pain and restlessness.
5. Liquid diet for three days, then an easily digested soft diet should be selected, and at the end of two weeks a restricted full diet.

Patients should be warned against overeating and also against too free indulgence in pastry, fried and greasy foods.

FOREIGN BODY IN THE RIGHT LOWER BRONCHUS.

Lieutenant J. W. GREEN, Medical Corps, United States Navy.

A. B.——, pharmacist's mate, 2d class, while smoking a cigarette in an amber holder was accidentally struck in the face by a friend. The holder broke in two parts, the bit being inspired. A severe coughing fit followed but the patient suffered no dyspnœa. He was of the opinion that he had swallowed the butt end of the amber bit. He had no symptoms for three days, when he developed a cough

which was unproductive and he complained of a tender area beneath the ensiform cartilage. Percussion showed no consolidation in the lungs. Upon auscultation there were moist rales over the lower and middle right lobes posterior, and at the junction of the sixth rib and the vertebra there was a whistling sound. X ray of the chest showed nothing in anteroposterior, lateral, and angulated views. The fluoroscope was next tried, but nothing could be seen. The cough continued, but the patient had no fever or other symptoms.

At the end of a week of investigation a 7 mm. bronchoscope was tried under cocaine anesthesia, and although the laryngoscope was passed without a great deal of difficulty the bronchoscope could not be passed. Three attempts were made under cocaine without success. The patient was next anesthetized with chloroform, after the lamps had been carefully tried out, sponge holders adjusted, and bronchoscopic forceps made ready. During the preceding week assistants had been informed of their duties and their proper positions in the operating room. Neither the operator nor his assistants had had any previous experience in the use of the bronchoscope.

The patient was anesthetized in the dorsal prone position after having first received morphine and atropine. An assistant supported the head which hung over the end of the table and kept the upper lip well away from the teeth and laryngoscope. The laryngoscope was carefully passed and the bronchoscope passed to the bifurcation of the trachea. A large amount of blood and mucus was carefully wiped from the trachea and bronchi. Several inches below the bifurcation of the trachea on the right side could be seen what appeared to be a marked constriction of the right lower bronchus. Purulent mucus, which was bloodstained, appeared at this point. This was again wiped away and long oesophagoscopic forceps were passed down to what appeared to be the foreign body. The jaws of the forceps were opened and pushed gently down and closed, one jaw within the lumen of the foreign body and one between the wall of the bronchus and the outside of the bit. The forceps were then closed and withdrawn. Considerable pull was necessary; the forceps were withdrawn as far as the lower opening of the bronchoscope and then forceps, bronchoscope, and foreign body removed together.

The patient made an uneventful recovery and returned to duty in four days still suffering from a slight bronchitis. The entire operation lasted about three hours, as considerable technical difficulty was encountered and the patient took the anesthetic very badly. The secretion expectorated following operation was bloodstained and had the odor of gangrenous lung. There was no reactionary fever and no dyspnœa.

The foreign body measured 1 by three-fourths by one-half inch. X ray of this amber bit cast no shadow whatever when tried on dental X-ray films.

Any hospital operating team can with a little instruction, practice, and patience remove foreign bodies from the bronchi. The greatest problem we encountered was the management of the lamps and clearing away of the accumulations of mucus. Aspiration of the mucus through the tube by suction was a failure. We failed to note the textbook pictures of the bronchial rings as described by Jackson.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander C. W. O. Bunker, Medical Corps, United States Navy.
Lieutenant Commander L. W. Johnson, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.
Lieutenant Commander J. J. O'Malley, Medical Corps, United States Navy.
Lieutenant Commander H. E. Harvey, Dental Corps, United States Navy.
Lieutenant Commander L. H. Clerf, Medical Corps, United States Navy.
Lieutenant L. W. Shaffer, Medical Corps, United States Navy.
Lieutenant E. Peterson, Medical Corps, United States Navy.

GENERAL MEDICINE.

SMITHIES, F. **Treatment of gastric ulcer.** Internat. Jour. Gastro-Enterology, July, 1921.

Peptic ulcer may or may not exhibit symptoms or signs; it may be closely mimicked by nonulcerous dyspepsias, and it is characterized by a peculiar periodicity. It is a disease about which little prophecy as to its extent or future course can be made from its symptomatology. It is indistinguishable clinically from early gastric cancer, syphilis, or tuberculosis. It rarely occurs in individuals not already affected with other abnormalities—infections about the head, throat, and neck, abdominal diseases, disturbances in the circulatory, eliminative, nervous, or lymphatic systems, and malfunctions of the digestive glands.

The immediate causes of ulcers vary widely and are highly individual. The essential point is that through some malfunction a point of least resistance occurs in the gastric lining and normal gastric physiology is permitted to produce an abnormal tissue change. When once the damage has been done locally in the stomach wall, whatever may have been the primary cause, the future course of the process is similar. Pepsin and hydrochloric acid attack the inert gastric cells; necrosis results and ulcer is established.

Standard treatments of gastric ulcer have as their basis the principle that gastric chemistry has been previously upset. This chemical disturbance is generally put down as an overproduction of acid gastric juice and pepsin. A recent study of 500 cases of peptic ulcer showed but 40 per cent with a free HCl concentration above 0.25 per cent. In 35 per cent the acidity was well within the normal range, and in the remaining 25 per cent the acidity was reduced or

absent. When once the initial damage to the gastric lining has been produced, digestion of the mucous membrane occurs with equal readiness in the presence of normal or even subnormal gastric acidity.

All local foci of infection must first be removed. The further treatment is influenced by the type of ulcer. Unless ulcers with much scar or causing great gastric deformity are demonstrated to be luetic, little hope of permanent relief can be offered by medical measures. Surgery promises the greatest prospect of relief in such cases. Intense pain, frequent hemorrhage, perforation, or the danger of malignant change also call for surgery. Excision should be performed when possible. If excision is impracticable, then infolding or cautery puncture, with or without gastrojejunostomy, yields the most satisfactory results. In nonobstructing ulcers gastrojejunostomy should always be accompanied by pyloric closure.

Successful medical treatment demands careful selection of cases. It is indicated only in ulcers with little callous or, if calloused, located in portions of the stomach in which stenoses are not liable to result, or where surgical procedures can not be carried out.

The author's method of nonsurgical treatment is described as follows: Rest in bed, both mental and physical rest, for one to three weeks. Physiologic rest to the stomach by starvation, avoidance of irritating medicine, lavage, or abdominal examinations, all of which stimulate peristalsis. Local applications to the abdomen of alcohol and boric acid. Keeping the stomach empty of food promotes healing by limiting irritation from the food, reducing the amount of gastric juice, limiting peristalsis and gastrospasm. Abstinence from food should be insisted on for 3 to 7 days. During the fast paraffin wax is chewed for 15 minutes every hour. This keeps the mouth clean, promotes the flow of saliva and mucus, counteracts hunger contractions and gastrospasms and allays thirst. Rectal feedings are used during the fast. Five hundred to 1,000 calories are given in 24 hours. The clystra contains 1 ounce of 50 per cent alcohol, 1 ounce of glucose, with normal salt solution to make 240 mils. It is given at body temperature by the drop method at the rate of 30 to 60 drops per minute. During the first day of rectal feeding 10 drops of tincture of opium are given with each enema. When mouth feeding is begun, small quantities of liquid food should be frequently administered, 4 to 6 ounces of barley water, rice gruel, thin cream of wheat, or thin creamed vegetable soup every hour. Milk is not given, since it produces pure protein clots in the stomach, which remain for a long time and produce irritation and acid production. Alkaline or other medicines are not needed. Alkalies cause oversecretion by the acid-producing glands. Atropin or bromides may be given in the early stages of the treatment to control gastrospasm

f alkalies are indicated, the best results are produced by small doses f milk of magnesia or calcined magnesia. Anemic patients require ron and arsenic in full doses. (L. W. J.)

[ERRICK, W. W. **Meningococcus infection. A summary of recent advances in the knowledge of its clinical features.** Pennsylvania Med. Jour. October, 1921.

This author gives an admirable account of his experience with ieningococcus infection at Camp Jackson from the clinical aspect nd that of treatment. He divides the disease into three stages—he local or nasopharyngeal stage, the stage of sepsis, and the stage f metastasis.

His opinion of carriers and their relative nonimportance in spread-ig the disease coincides with the views of other men who had ex-erience with this disease during the war. The factor of individual usceptibility is brought out as of prime importance. The author mphasizes the stage of sepsis or of general blood-stream infection hen the diagnosis should, if possible, be made to insure early treat-ient. He gives a full résumé of symptoms that occur during this eriod, that lasts as a rule about 48 hours before the onset of menin-eal irritation. Blood cultures are positive in up to 80 per cent of ll cases, depending upon the care used and the period when made. he symptoms are rather indefinite. Temperature is, as a rule, be-ween 99 and 101° F., pulse rapid, and blood pressure low.

The patient is resistant and peevish, his face is expressionless, his ook vacant, and voice monotonous. He complains of general aching nd soreness. Coryza, pharyngitis, or tonsilitis are common, the ral secretions are scant thick, and viscid. The mouth dry and lazed. There is an ashen mottling of the skin or cyanosis of face nd ears. The rash is characteristic, usually petechial in chara ter, onsisting of subcutaneous hemorrhages, the size varying from pin oint to areas of 1 inch in diameter. These spots come out with xtraordinary rapidity in successive groups, lasting about 48 hours. hey do not disappear on pressure. The number and size vary irectly with severity of infection.

The reflexes are exaggerated except in toxic cases; importance ould be placed on the inequality of corresponding reflexes on both des of the body.

The cerebrospinal fluid is clear in the beginning with no abnormal lements. Meningococci make their appearance as isolated individu-ls, globulin is increased, and finally cells begin to appear in num-ers, and within a few hours a purulent process is established.

After a period of about 48 hours of generalized infection, the sual symptoms of meningeal involvement develop—headache, de-

lirium, slow pulse, stiff neck, retracted head, positive Kernig's and Brudzinski's signs.

Other metastatic complications are arthritis (5–15 per cent), both polyarthritis and monarthritis occurring, the former denoting a serious infection, the latter usually having a good prognosis; opthalmia, occurring in 5 per cent of the cases, in which vision may be lost within a few hours; pericarditis in 3 per cent indicating a serious infection, in which aspiration of the fibrinous or purulent exudate with injection of antimeningococcus serum into the sac may be a life-saving measure; endocarditis rare; epididymitis in 10 per cent of the cases, apparently not followed by testicular atrophy.

Hydrocephalus meningitis or subarachnoid block is a serious complication and may set in with a stormy course, marked by clouded mentality, cyanosis of the face, distension of the veins of the forehead, and marked meningeal or cerebral irritation. The author brings up the point that the process is possibly primary in the vascular apparatus of the encephalon as a whole and that the meninges are attacked from within, microscopical study of the brain showing that it is involved. Venesection or hypertonic solution of glucose intravenously or both may be recommended in the event of suspicion of this grave complication. Less acute forms of hydrocephalic meningitis may be more common, affecting the layer of pia-arachnoid roofing over the fourth ventricle blocking the foramina of Luschka and Majendie. The obstructive type may be caused by organized adhesions blocking the aqueduct of Sylvius with resulting dilatation of the ventricular system above the point of obstruction.

Subarachnoid block should be suspected when there is failure to obtain more than a few drops or a few cubic centimeters of cerebrospinal fluid by lumbar puncture, lack of response to treatment by appropriate serum, evidence of excessive meningeal irritation, rapid emaciation, prolonged course, distension of veins of the head, bulging ing fontanel(?), and clouded consciousness. When this condition is suspected Cobb's method should be tried first: Lumbar puncture is performed, needle left in place, and vigorous manipulation of the head upon the neck is done under chloroform anesthesia. This measure folds and unfolds the layer of pia-arachnoid which lies between the brain stem and cerebellum and which contains the foramina of Luschka and Majendie. If this measure fails, ventricular puncture must be done without delay. It is not a grave procedure and a somewhat less amount of serum than fluid removed should be permitted to flow into the ventricle. This may be repeated daily as a last resort. Puncture of cisterna magna is permissible in cases of communicating type, although there is serious danger of hemorrhage from injury to the regional veins.

The author emphasizes his importance of early diagnosis and subsequent early treatment. In his series of 330 cases, 125 that were diagnosed in the stage of clear cerebrospinal fluid had a mortality of 15.2 per cent, whereas the 205 cases that were diagnosed after the cerebrospinal fluid had become cloudy had a mortality of 34.6 per cent. The aim of treatment in the early phases of infection should be sterilization of the blood stream by massive doses of antimeningococcic serum. The chief reliance during the stage of sepsis should be intravenous serum therapy, repeated every 8 to 12 hours in serious cases and every 24 hours in average cases. When the cerebrospinal fluid is cloudy, serum should be given intraspinously every 24 hours as long as acute symptoms last, then less frequently. Lumbar puncture should be made every 48 hours during early convalescence to determine at the earliest moment a possible relapse.

If the meninges exhibit intolerance of the serum, it is usually best to omit this treatment. Serum rich in antibody content should be used. Due to the practical difficulty in obtaining specific monovalent serums the polyvalent serum should be used. (E. P.)

Brooks, H. **Syphilis of the heart.** Amer. Jour. of Syphilis. April, 1921.

Syphilis involves the heart with great frequency both in early and in its later stages of the infection.

Syphilitic lesions of the heart may involve the pericardium, the endocardium, and the conus arteriosus. The most frequent lesions apparently originate or progress about the terminals of the coronary system, and they are located for the greater part in the myocardium.

Any form or stage of syphilitic lesion except chancre may be found in the heart.

Cardiac involvement may appear very early in the infection, when it may terminate fatally; it may long remain quiescent or first become apparent late in the disease.

The signs and symptoms of syphilis of the heart are simply those resulting from the particular lesion present, and often few or no definite clinical characteristics are developed aside from the association with a history of infection, the Wassermann reaction, and the relief of symptoms and signs under specific treatment.

Ordinary methods of cardiac treatment fail to give relief of the signs and symptoms of the disease unless combined with specific medication.

Syphilis of the heart may in most early cases be cured by specific treatment. Late cases can be much improved, entirely relieved, or perhaps cured by specific treatment.

Diagnosis rests chiefly on a history of infection, concomitant signs of it in other tissues, the positive Wassermann reaction, and notably on relief under specific treatment.

Successful treatment in any case rests on the recognition of the cause of the disease. (L. W. S.)

Fraser, A. R. **The standard of cure in gonorrhea.** Jour. of Urology. May, 1921.

The question of a standard of cure in gonorrhea is a vexing one. Every urologist has laid down his own standard. These are widely divergent. It is difficult to work out a standard which would meet all the various requirements laid down. Many standards err on the side of being too low, while others aim so high that the carrying out of the various tests and examinations defeats its own end.

Various factors have been utilized in compiling an exhaustive and rigid standard of cure. They are (1) examination of discharge, (2) examination of the urine, (3) behavior after exercise, (4) absence of complications, (5) provocative vaccine, (6) search for gonococci, (7) the urethroscope, (8) the compliment fixation test, (9) period kept under observation, (10) subsequent examinations.

After reviewing some of the various standards that have been advised, the author advances the following as a satisfactory, workable, and sufficiently rigid standard of cure:

(1) Disappearance of all clinical symptoms and the cessation of treatment.

(2) Patient is kept under observation for 12 days during which he takes vigorous exercise. He should be free of meatal discharge and urine clear in two glasses. If, however, a few fine threads persist, they should be disregarded.

(3) A provocative dose of 100,000,000 gonococcus vaccine should be given about the second or third day after cessation of treatment, and no focal reaction should follow.

(4) A curved sound should be passed on the fourth and twelfth days and the urethra gently massaged on the sound. No pus should appear at the meatus and subsequent urines should be unaltered.

(5) In the third and again in the sixth month the patient should return for resurvey, consisting of two-glass urine test, massage of prostate and seminal vessicles with examination of the secretion, general systemic examination, examination of urethra by olivary bougies, curved sounds, or in special cases urethroscopic exploration. Should this examination in any way be doubtful, a provocative vaccine should be given and future action modified according to the result. (L. W. S.)

O'Leary, P. A. **The provocative procedures in the diagnosis of syphilis.** Arch. of Derm. and Syph., 1920, Vol. II, p. 348.

The provocative procedure employed by the section of dermatology and syphilology of the Mayo clinic consists of a single intravenous injection of 3 decigrams of arsphenamine, with a series of seven Wassermann tests made at 24-hour intervals, the first blood being drawn just before the arsphenamine injection, and, if indicated, daily observation of the patient. Four factors contribute to the diagnostic worth of the procedure: (*a*) A true provocative effect on the Wassermann reaction; (*b*) the advantage of a series of Wassermann tests which strikes the average and assists in the interpretation of the spontaneous or technical variations of the ordinary Wassermann test; (*c*) an opportunity to observe a local flare-up in a visible lesion, the "Jarisch-Herxheimer reaction;" (*d*) the beginning of the therapeutic test. About one-fourth of the value of the procedure is ascribed to the provocative effect, one-half to the Wassermann series, and the remaining fourth is divided between the Herxheimer reaction and the therapeutic response elicited. The provocative procedure, including the Wassermann series, Herxheimer reaction, and early therapeutic effect, adds about 16 per cent to the sensitiveness of a conservative Wassermann test in the diagnosis of syphilis. Although the author believes that gradations in the strength of the true provocative effect are not essential to a positive result, and although a single positive reaction among a number of negative reactions is usually significant, it must be remembered that the provocative procedure here described is subject to the same margin of error and calls for the same interpretation of serologic methods as the Wassermann reaction itself. False positive tests and persistent negative results in the presence of syphilis may occur, as in all Wassermann technics. The use of hypersensitive antigens in a provocative procedure is to be deprecated, since they increase the risk of false positive results beyond the point justified by the general value of the procedure in diagnosis. A negative provocative test does not establish the fact of cure, but a positive provocative result is of assistance in recognizing an infection which might otherwise have remained concealed. The provocative procedure described is of no value alone, and should be regarded merely as a part of a general syphilitic examination. The procedure, for example, may yield negative results in the presence of positive spinal fluid findings. The provocative procedure is not a substitute for clinical judgment, and should be regarded in doubtful cases merely as the beginning of a therapeutic test. (L. W. S.)

Mitchell, J. H. **Intraspinal treatment in neurosyphilis.** Arch. of Derm. and Syph., 1920, Vol. II, p. 44.

The Swift-Ellis intraspinal method of treatment of syphilis of the central nervous system is superior to intensive intravenous treatment alone. Whether the efficiency of the method of treatment depends on (*a*) the irritative action of the serum, thereby increasing the permeability of the choroid plexus for arsphenamine; on (*b*) the spirocheticidal action of the arsphenaminized serum, or on (*c*) spinal drainage, remains to be determined. The method is perfectly safe when care is exercised in technic and in the proper selection of cases, and should be resorted to in all cases in which the patient fails to respond to intravenous medication. (L. W. S.)

Brown, W. H., and Pearce, L. **A note on the dissemination of spirochaeta pallida from the primary focus of infection.** Arch. of Derm. and Syph., 1920, Vol. II, p. 470.

While the conditions of these experiments are not entirely analogous to those that attain in cases of human infection, the general course of events is undoubtedly much the same in the two cases. It would appear, therefore, that, for practical purposes, there is probably no appreciable time during which a syphilitic infection can be regarded as confined to the focus of entry, but that immediately infection takes place the spirochaetes begin to multiply and invade the surrounding tissues, gaining access to both the lymphatics and the blood stream, and are widely distributed over the body even before the initial lesion can be detected. The early appearance of a distinctive lesion at the site of infection and the lapse of time required for the development of generalized lesions are to be viewed more as a result of a sequence in localization and concentration of spirochaetes at given points than as indications of the time required for their dissemination. (L. W. S.)

Chambers, J. Q. **Abdominal syphilis.** Jour. Miss. State Med. Assoc., 1920, Vol. XVII, p. 415.

The author feels that he has shown in this presentation of cases that syphilis plays a very much more important rôle in gastrointestinal pathology than is usually supposed. When one realizes that carcinoma or ulcer of the stomach, various functional or organic dyspepsias may be absolutely duplicated by syphilis of the stomach, while the parasyphilitic tabes may present the most variable gastrointestinal syndromes—here violent epigastric pain, suggesting perforating gastric ulcer or gallstone colic, here intractable nausea and vomiting,

ere colonic crises which almost duplicate in symptomatology either cute appendicitis or acute enterocolitis, while in other periodic ttacks of the most profound diarrhea may be met with—it should ake us realize that we should always be on the alert for manifestaions of this disease either in the past history or in the complete hysical examination of the patient. The author feels sure that if uch possibilities are thought of, if the history is taken carefully, if he physical examination is complete, with, of course, careful study f the blood, or even the spinal fluid if indicated, an increasing numer of gastrointestinal lesions regarded as due to other causes will in eality be shown to be sypilitic in origin. (L. W. S.)

IBBES, J. H. **Pulmonary syphilis.** South. Med. Jour., 1920, vol. xiii, p. 788.

A chronic pulmonary disease physically indistinguishable from he common types of chronic pneumonitis and producing a sympmatic picture similar to that of pulmonary tuberculosis is not inrequently associated with a positive Wassermann reaction, and the avorable change in general and local conditions following antiyphilitic treatment is so striking as to lead one to the opinion that he syphilitic process is at least in part responsible for the pulmonary athology. A Wassermann reaction should be routine in the investiation of all chronic pulmonary diseases, even though the tubercle acillus or other organisms be found in the sputum. (L. W. S.)

OBERTSON, W. S. **Diagnosis and treatment of early syphilis.** W. Va. Med. Jour., 1920, Vol. XV, p. 164.

The points in dealing with early syphilis, upon which particular tress is to be laid, are as follows: (1) A positive diagnosis of syphilis an be made with the dark field before the infection is generalized; 2) the progress is immeasurably improved if the treatment is begun efore the system is swarming with the treponema; (3) repeated exminations must be made both of the blood and the spinal fluid to etermine, in the absence of clinical symptoms, the necessity for dditional treatment; (4) only when the findings of the blood and he spinal fluid are repeatedly negative and the case is clinically free f evidences of the disease are we justified in discharging the patient s cured. (L. W. S.)

ACOBI, L. **Reinfection and curability in syphilis.** Arch. of Derm. and Syph., 1920, Vol. II, p. 493.

The question, "Is syphilis curable?" can not be answered definitely n the light of our present knowledge. The occurrence of reinfec-

tion in syphilis may be accepted as an established fact. Reinfection, however, is by no means evidence of curability. These two conceptions do not stand and fall together, as many believe; they are not contingent on each other and should be dissociated in the interest of clear thinking and unbiased judgment. (L. W. S.)

Kritchevsky, B., and Seguin, P. **Local and General Spirochaetosis.** Dental Cosmos. September, 1921.

Dental practitioners will find the brief article by Dr. B. Kritchevsky, professor at the Ecole Francaise de Stomatologie, and P. Seguin, of the Pasteur Institute of Paris, interesting, as it deals with the bacteriology and treatment of pyorrhea. This subject has occupied the attention of many, and the multiplicity of findings have left one in doubt and open to the conviction that perhaps the bacterial flora were incidental.

In assigning definite causative bacterial factors, which are based upon clinical and laboratory findings by the two research workers above named, a definite step forward is hoped for in the solution of this vital problem of centuries. Past experience has proven that the determination of a definite etiology is often followed by a special treatment and no exception apparently exists in the present instance, as a treatment is suggested which is essentially intravenous or intramuscular injections of small doses of neosalvarsan, local applications of the same medicament, and autovaccine treatment in the form of pyoiodo vaccine. Further clinical reports from other investigators will be awaited with much interest, and, aside from a practical application, the article quoted is interesting from an academic standpoint as furnishing a bacterial theory for the cause of pyorrhea.

"We have made numerous experiments on guinea pigs, taking the secretion of the different affections of the mouth and serous cavities of pyorrhea alveolaris, trench mouth, Vincent's angina, mercurial stomatitis, etc., and in each case injecting this secretion subcutaneously into the animal. We obtained in the greater number of cases characteristic abscesses, which contained spirochetes, fusiform bacilli, and cocci.

"By a microscopic examination of a section of pyorrhetic abscess, made on an animal, we generally see, going from the center of the cavity of the abscess, first, a zone of pus with a collection of cocci, spirochetes, fusiform, and vibriones. Then comes a layer of total necrosis exclusively filled with fusiform bacilli; no cells can be distinguished. Then we come to a zone of greatly altered tissue, but which is recognizable; the cells can be differentiated, and are filled with fusiform bacilli and spirochetes. In the next layer the fusi-

form bacilli become rarer and rarer, and we come to a wide zone of pure spirochetes. Then we see a great number of phagocytes, limited by a zone of fibrous tissue forming the sac. Sometimes instead of the formation of a localized abscess with a fibrous wall limiting the spread of the infection, we find a generalized spirochetosis. When these germs, spirochetes, and fusiform bacilli invade all the serous cavities, peritoneal, pleural, liver, kidney, etc., the animal dies of general infection. By injecting a pure culture of any spirochetes mixed with a pure culture of fusiform bacilli we form the same local abscess; but by injecting only spirochetes or only fusiform bacilli no lesion is obtained.

"Conclusion: From these observations and the examination of slides, the following conclusion can be drawn, that several spirochetes in combination with fusiform bacilli form a necrotic agent, destroying the tissues without the formation of pus. The mechanism of this destruction is the invasion of the tissues by the spirochetes, which by their toxin probably prepare the tissues for the final destructive and necrotic action of the fusiform bacilli, after which the tissues lose all their characteristic aspects. This is probably why in many cases of pyorrhea we find no pus, especially in the first stage of the disease. Pus is the product of a secondary infection by different aerobic and anaerobic cocci. Pusless pyorrhea is generally found in the beginning. We find pyorrhea pockets only after the first destruction, when the spirochetes and fusiform bacilli have had time to form a sufficiently deep place for the cocci to be retained and commence their pus-forming action. In this stage pus is found, and the smears will show more cocci than spirochetes.

"If our conception of the cause of pyorrhea or any other spirochetosis accepted, the treatment of this affection becomes obvious: First of all, we must combat the spirochetes by a general and local application of neosalvarsan. When these spirochetes disappear, the fusiform bacilli, which by themselves are not pathogenic, have no longer any possibility of existence. We generally begin by an intravenous or intramuscular injection of small doses of neosalvarsan, 0.10 to 0.25; three or four injections are usually sufficient. A local application of 10 or 20 per cent solution of neosalvarsan in glycerin is then made. We hope in the near future to prepare a dental paste containing the same agent, to give the patient the means of fighting against the infection himself.

"Secondary infection should be attended to by a general and very conscientious pyorrhea treatment, scraping, polishing, etc., and the different antiseptics known to every practitioner for combating this secondary infection should also be used. Autovaccine treatment should also be applied. We ourselves employ the pyoiodo vaccine discovered by M. Weinberg and P. Seguin, which is very useful."

The facts above presented furnish a reason why local medication as a whole has proven so unsatisfactory, the deep penetration of the spirochetes and to a lesser degree the penetration of the fusiform bacilli have prevented such local applications from coming into contact with the organisms in the tissues in sufficient strength to exert inhibitory or destructive influence.

Theoretically local applications may prove of value if a germicide can be selected which will penetrate necrotic and vital tissues in sufficient strength to exhibit germicidal properties without thereby destroying the vitality of tissue cells. (H. E. H.)

Reasoner, M. A., and Nichols, H. J. **The use of arsphenamine in nonsyphilitic diseases.** Jour. of the Am. Med. Assn., 1920, Vol. LXXV, p. 645.

For practical therapeutic purposes the beneficial effects of arsphenamine are most apparent in a limited number of spirochetal diseases. They act as a specific in Vincent's angina, relapsing fever, yaws, gangosa, and pulmonary spirochetosis (if given early) in man and in equine influenza. A therapeutic effect is noted in rat-bite disease, in certain dental conditions, and in fowl spirochetosis. The complete measure of the effect in the latter condition has not yet been established. No apparent benefit has been noted in such other spirochetal diseases as Weil's disease and yellow fever. Good results have been obtained in syphilitics, in a number of nonsyphilitic diseases that are influenced adversely by that disease. Their use has been recommended in conditions in which arsenic is indicated. In such case the effect is alterative rather than specific, and ordinarily there is no special advantage over liquor potassii arsenitis. There is a limited effect on certain protozoal diseases, as malaria (tertian and quotidian), some of the trypananosomiases, and leishmaniasis. It is possible, however, that this effect may be nonspecific. With the exception of anthrax and possibly glanders, few favorable results are reported in bacterial diseases. Except in Vincent's angina, arsphenamine should be administered intravenously in medium-sized dosage. Two or three injections usually accomplish the desired purpose, except in pulmonary spirochetosis, which may require a series of injections. In diseases showing liver involvement it is recommended that neoarsphenamine be given on account of its supposed lesser degree of toxicity. (L. W. S.)

Michel, L. L., and Goodman, H. **Prophylaxis of syphilis with arsphenamine.** Jour. of the Am. Med. Assn., 1920, Vol. LXXV, p. 1768.

The authors have called attention to a method of preventing syphilis which they have found efficacious and which has not previously

been described in American literature. The injections of arsphenamine in small doses in persons who present no lesions and who are definitely known to have been exposed to syphilitic infection has in all the cases resulted successfully as a prophylactic measure. The time since exposure has little bearing on the result, but must be taken into consideration when the minutiæ of the procedure are under consideration. In two reported cases a single injection has been held as ample. In a patient under their own care they intend to use a modification of the abortive cure, although she presents no lesions, because the date of exposure is longer than the usual incubation time of syphilis. That the method will encounter objection has already been proved; but it will continue to be a procedure that will fill its place in the prophylaxis of syphilis. (L. W. S.)

SURGERY.

Symmers, D., and Vance, B. M. **Epitheliomata of thymic origin.** Arch. Intern. Med. September, 1921.

The histogenesis of the thymus is still a subject of debate, but it seems that the conception of the small thymic cell as a lymphocyte is more in harmony with common knowledge of the pathology of the gland, especially its tumors.

It is supposed that the parenchyma of the gland has a dual embryogenesis, the lymphoid cells being derived from the mesoderm and the epithelium from the ectoderm. It is possible to divide tumors of the thymus into two groups—one group springing from the preponderating cell, the lymphocyte, and the other group arising from that cell which originally dominated the thymus, but which, as development proceeds, is projected into the background, the epithelial cell.

Only three examples of primary thymic epithelioma are to be found in the literature, and a fourth is recorded in this article.

The first recorded case occurred in a female, aged 52 years. The patient stated that three months before admission to the hospital she suffered from retrosternal pains, which gradually grew worse and became associated with signs of suffocation, dyspnea, and cyanosis, edema of legs, and marked emaciation. At necropsy a massive tumor measuring 16 by 11 by 13 cm. was found above the heart in the region of the thymus, which on microscopic section showed cells of epithelial origin. A small metastatic nodule was found in one kidney.

The second case occurred in a man 56 years of age. This patient complained of retrosternal pains, dyspnea, with loss of weight and strength. The total duration of illness was two years. At necropsy a tumor was found in the thymic area, about the size of an adult

head. There were no metastases. Microscopic section showed the tumor belonging to the epithelioma class.

The third case occurred in a man 62 years of age. During life he presented no signs referable to a growth in the thymic region. At necropsy a mass was found between the sternum and pericardium, corresponding to the usual location of the thymus. It measured 12 by 7 by 5 cm. and sections showed epithelial cells.

The fourth case was in a man 58 years of age, who died four months after admission to the hospital. His symptoms appeared three weeks before admission and consisted of severe burning pains in the dorsal spine and pain in the sternal region on swallowing. Later he developed a complete paralysis of the body below a level corresponding to the fifth dorsal segment, with the loss of the knee jerks and a bilateral Babinski. The spinal column was opened and a tumor removed from the dura which measured 6 by 2½ cm.

Except for pain on swallowing, the patient at no time exhibited signs or symptoms referable to pressure in the anterior mediastinum. On autopsy a tumor mass was found in the thorax, in the position of the thymus, and it measured 10 by 8 by 3 cm. Metastatic nodules were found in the pleura of left lung, in the parenchyma of both lungs, and in the dura of the dorsal cord.

From the clinical standpoint tumors of the thymic parenchyma, both epithelial and lymphocytic, present certain features of practical interest. First, the lymphocytic tumors outnumber the epithelial by a considerable margin. Moreover, the lymphocytic tumors in the majority of cases occur in individuals under 35 years of age, many of them in children, while all of the few epithelial tumors that have been recorded occurred in persons over 50 years of age.

Second, there are considerable variations in the matter of physical signs. For example (*a*) certain tumors of the thymic parenchyma grow expansively in the upper thorax for long periods of time without giving rise to noteworthy signs of pressure. These growths represent a minority, it is true, but that they exist is shown by the complete absence of pressure effects in the third case reported, and by the presence of a comparatively trivial complaint in the fourth case, namely, pain on swallowing. (*b*) Others grow expansively in the upper thorax and are attended by marked signs of pressure—cough, expectoration, dyspnea, cyanosis, and edema, particularly of the right side of the chest anteriorly and of the corresponding arm, due to interference with the circulation in the innominate and subclavian veins; hydrothorax, ascites, and the like. A subdivision of this group is represented by those thymic lymphosarcomas which grow expansively for a period of months or years, and suddenly terminate life with the picture of acute leukemia, the tumor pouring

lymphocytes into the circulation abruptly and in large numbers—the so-called leukosarcoma of Sternberg.

From these facts it is apparent that primary thymic tumors, whether of the lymphocytic or epithelial type, are inconstant in producing signs of intrathoracic pressure—some of them appear to infiltrate so insidiously that the structures of the mediastinum are enabled to accommodate themselves to the process of invasion, and pressure symptoms, if they arise at all, are negligible in degree; others gradually attain enormous proportions, and, suddenly and for no apparent reason, become associated with signs of intrathoracic pressure, followed in a few weeks by death, while still others are marked by pressure signs that arise early and are persistent and most distressing. Finally, primary tumors of the thymus, as exemplified by the case described, may give rise to comparatively mild signs of intrathoracic compression, but, by metastasis, may produce terrible destruction in adjacent extrathoracic tissues. (J. J. O'M.)

Sistrunk, W. E. **Surgical treatment of epithelioma of the lip.** Ann. Surg. May, 1921.

Epithelioma of the lip is one of the most favorable types of malignancy, because the diagnosis is easily made and the growth and glands draining it may be easily removed, and yet many die of this disease.

In small growths, when the diseased tissue can be removed by the ordinary V incision, it is best to excise the glands first, and immediately after the incision is closed remove the growth from the lip. If possible, the glands should be examined immediately.

One hundred and thirty-six cases operated in the Mayo clinic were studied statistically in three groups. Group 1 comprised 93 cases in which a primary complete operation was performed when the glands were not involved. Ninety and three-tenths per cent were alive 5 to 8 years after operation; 11 showed local recurrences; 3 had recurrences in the glands, which were afterwards removed. Group 2 comprised 11 cases in which the glands were involved at the time of operation. In 6 cases a block dissection was done; of these 5 are dead, and the other is alive five years after operation. In the other 5 cases no block dissection was done; of these 4 are dead 1 is alive nearly 6 years after operation. Group 3 comprised 27 cases in which the growth only was excised. Nineteen of the patients are alive 5 to 8 years after operation.

Rapidly growing epitheliomas are best removed with the actual cautery without attempting to perform a plastic operation at the time. (L. W. J.)

Hirsch, E. W. **The light and heat treatment of epididymitis.** Uro. and Cut. Rev., August, 1921.

The writer, after a short review of the present methods of treating acute or subacute epididymitis, recommends the application of the heat and light rays from a 100-watt blue nitrogen bulb screwed into the socket of a deep reflector, which is placed 1½ inches to 2½ inches distant from the scrotum, which is suspended by an adhesive plaster bridge. The diseased part is covered with a gauze dressing wet with magnesium-sulphate solution, and the light of the lamp above the dressing is determined by the tolerance of the patient, the amount of heat supplied, the thickness of and the amount of moisture on the gauze dressings. If in 24 hours the inflammation shows signs of subsiding and in 48 hours the patient is materially improved, it may be assumed that this form of treatment has been successful. However, if the pain and tenderness do not abate and the temperature remains high, pus is probably present and Hagner's operation is indicated. (W. M. K.)

TROPICAL MEDICINE.

Alcock, A. **Recent progress in medical zoology.** Trop. Dis. Bull. London, July 15, 1921.

The author in his introduction tells us that the business of medical entomology as now understood, is, in the case of any species convicted on pathological evidence of being a standing danger to the public health, to unriddle its biology in every detail ,and to investigate all the varying circumstances that influence its acquisition and retention of pathogenic capacity. "The biological inquest must comprehend every stage of the creature's existence, from the egg to the engendering adult, and must include not only its affinities and its structure, but also its bionomy and its relations to environment. The bionomic inquiry must embrace the geographical distribution and seasonal incidence; the habits and the hours of activity; the powers and range of locomotion and the propensity to spread; the food preferences, meteorological influences, and power of resisting vicissitudes of season and climate; the sexual instincts and fecundity; the mode of reproduction, breeding places, and seasons, and the provision for larvæ; and the duration of life in every stage of development. If it be not a specific parasite, the bionomic investigation must also include the relations of the species to its environment, organic and inorganic, such as the physiographical and hydrographical features of the habitat, natural shelters, help givers, parasites, enemies, and rivals . . . With the accumulation of exact information on all these points and the rational inference drawn from it, medi-

cal entomology claims to be a science of practical application in preventive medicine—in short, a branch of hygiene, and a branch which although it finds its fullest and most constant application in those tropical countries where sanitary arrangements are still crude and imperfect, can not in the mutability of human affairs be neglected in any country.

During the year much has been written about the species of Anopheles that are susceptible to malarial infection. Most workers on this subject now realize that while knowledge of specific infectibility under laboratory conditions is valuable, observations of the facts and conditions of infectivity in nature are of much greater practical value, as in any given area they point out the species that require control. One writer maintains that the primary aim of a malaria survey is to detect the naturally infected Anopheles carriers, and to study their ecology exhaustively, both in the larvæ and adult stage, so as to concentrate efforts at control wholly on the species that are unquestionably concerned in the local propagation of malaria. The disease seems to have disappeared spontaneously from western Europe without any correlative disappearance of *Anopheles maculipennis* from the local fauna. The explanation offered is that this variety of mosquito is reluctant to feed in the open, and prefers the blood of domestic animals to that of man, so that under modern conditions in western Europe the sheds where domestic animals are housed are a barrier against that perennial communion of man and Anopheles upon which malaria depends.

Another subject which has attracted a good deal of attention is the possible persistence of malarial infection in the individual Anopheles through the winter. Wenyon, working in Macedonia with *A. superpictus*, observed that the development of oocysts could be arrested for as long as three weeks by cold and then revived by appropriate warmth. Mayor in the autumn infected Culex with the Proteosoma parasite, and discovered five weeks afterward that not only the insect's salivary glands, but also all the muscles of the body and appendages and the palpi, were heavily charged with sporozoites. Mühlens at the same season infected Anopheles with *Plasmodium vivax*, and 26 days afterward found the same heavy generalized sporozoite infection of the insects.

A great deal has been written on the subject of malaria-mosquito control. For the destruction of mosquito larvæ several authors have extolled cresol, safe dilutions of one part in a million being said to be rapidly fatal. Roubaud recommends powdered commercial paraform (trioxymethylene) sprinkled on water as specifically fatal to mosquito larvæ. An ingenious method of distributing petroleum by mooring bags of sawdust or cotton waste, soaked with it, awash in the current of the stream, or by scattering such sawdust broad-

cast on boggy ground has been advocated. The cosmopolitan waterweed, chara, has been mentioned as interdictive to Anopheles larvæ. Much has been written about destructive surface-feeding fish, but the opinion is gaining ground that fish as antimalarial auxiliaries have but a limited use.

From Australia and Formosa come evidence that *Stegomyia fasciata* and not *Culex fatigans* is the transmitting agent of the virus of dengue fever in those countries. (W. M. K.)

Christopherson, J. B. **Intravenous injection of antimony tartrate in bilharzia disease.** Proc. Roy. Soc. Med. London, June, 1921.

The treatment of bilharzia disease by intravenous injections with antimony tartrate is now being carried out extensively in Egypt, South Africa, and elsewhere. The term "antimony tartrate" includes potassium antimony tartrate (tartar emetic) and sodium antimony tartrate. Both are colorless, stable salts which keep well in the Tropics and can be sterilized by boiling, and neither is too toxic to be used intravenously. The sodium salt is preferred. It is less toxic, more soluble, and possibly more efficient than the potassium salt.

Antimony tartrate has two distinct actions in bilharzia disease—it kills the ova deposited by the worms, and it kills the adult worms. Of these two actions, by far the most important is the action on the ova. A patient carrying ova spreads the disease broadcast, but if he is efficiently treated with antimony tartrate he ceases to be a carrier, and the spread of the disease is cut off at its source.

The intravenous injections are given every other day. The initial dose is ½ grain of antimony tartrate dissolved in 3 c c. of water. The dose is increased by ½ grain each injection, until the maximum dose of 2½ grains is reached, then 2½ grains (dissolved in 10 c. c. of water) are continued every other day until the course is completed. From 20 to 30 grains are necessary to effect a "cure." Young people with healthy organs stand injections of antimony well; therefore it is not necessary to commence with less than ½ grain even in a child of eight years. The best time to give the injection is about 2½ hours after a light meal. Intravenous injections of antimony tartrate are equally efficient in vesical and in rectal bilharzia. (W. M. K.)

Jona, G. **The complexion of malaria cases.** Policlinico, Rome. July 18, 1921.

The paper reports a clinical lecture at which 15 malaria cases of both sexes, various ages, and varying degrees of infection were shown. The color of the skin varied from pale yellow, dirty yellow, earthy yellow, to grayish earthy brown, ordinary icterus, and waxy white.

The author states at the outset that he considers these various hues in no way diagnostic or characteristic of malaria. He affirms that the variations are not determined by degrees of infection. They depend on original differences in individual skins whose appearance after malaria is caused by thinning out and reduction of the blood circulating beneath them. Ordinarily the individual peculiarities of coloring are masked by the background of the red circulating blood. Alterations in the color of this background permit differences in the skin to be recognized.

The writer maintains that after pressing out the blood from the skin of a given number of healthy individuals these normal variations of tint will be apparent at once. He is convinced from a long and patient study of the subject that in a given locality the percentage of yellow malaria patients will be the same as that of healthy persons with yellow skins.

But the normal fundamental tint is not always yellow. In a fair proportion of individuals it is brown, or grayish brown. Such a skin robbed of its red-blood background becomes earthy gray, and there will be malaria cases of this tint in the same proportion.

In city dwellers and in the country, among the women only, there is a certain number of people with white skins—altogether white or with the faintest suggestion of yellow. The absolutely white skin is rare. Among Italian women resident in cities it does not exceed 2 per cent. In Italian women afflicted with malaria the same figure holds.

The yellow tint of malaria is diffused over the whole person, but most conspicuous on the face and hands. The most intense coloring is on the palms of the hands and the soles of the feet, varying from light canary yellow to a deep orange yellow. The writer has estimated that the palmar-plantar yellow occurs more frequently in malaria than in typhoid.

Of course, the reader will ask if the pigment derived from the blood disintegration characteristic of malaria does not play some part in the alterations of complexion. This question is answered in the negative after many years of study and observation, including histological investigation of cases of pernicious anemia. The author has found even in cases of pernicious malaria where the blood destruction is greatest the same proportion of yellow and white complexions as in the milder infections.

Three types of pigment circulate in malarial blood—melanin, hemosiderin, and bile pigment. Leaving the latter out of consideration for the moment let us speak of the other two. Melanin (which according to the majority has no iron) is rich in sulphur. Hemosiderin is rich in iron. The former is the result of changes in hemo-

globin wrought within the body of the parasite. The latter is due directly to the breaking up of the red cell.

Hemosiderin appears as granules or little masses of yellow ocher or golden color not unlike the yellow pigment common in the healthy skin (of Italians), and itself related to the melanin group. The difference between the normal and abnormal yellow pigment is both morphological and chemical. As to form, the difference is this, the abnormal yellow pigment occurs in irregular polymorphus masses; the normal occurs in fine granules of equal size. Chemically, the abnormal pigment gives a reaction for iron; the normal skin pigment does not. Now, in examining cases of pernicious malaria the writer never found pigment giving the reaction for iron, which is not surprising, since such pigment is exceptional in health.

The exact chemical nature of melanin is disputed. Is it a true hematin derived from hemoglobin changes incident to the process of nutrition in the parasite or not? However that may be, melanin always occurs as black granules and masses. But the writer never recovered melanin from the skin of malaria patients. The pigment resulting from hemolysis is deposited in all the viscera, but mainly in the spleen, liver, and bone marrow. As a rule, the skin does not take up pigments of hemolytic origin, whether the disease be malaria or pernicious anemia.

Yet, how explain the strong and general clinical conviction that the complexion of malaria patients has some meaning? It has a meaning, but one which must be explained and defined. Note that in malarious children and young adolescents the skin is usually clear, fresh, and healthy looking, but for its pallor. Because of their youth or the suddenness of the attack, with its rapidly developing anemia almost equaling a hemorrhage in reducing the red corpuscles, these young people retain much of their normal appearance. On the other hand, aged persons suffering from malaria will rapidly develop a cachectic tint not unlike that due to malignant disease. It is because in the elderly the skin is atrophic and inelastic. This, combined with anemia, gives the picture of the grave anemia of cancer.

Recently a case was shown at the clinic which, judged by the complexion alone, would have been diagnosed either a severe malarial infection or a case of neoplasm. It was the result of a post-hemorrhagic anemia. Again, a case was recently presented which was assumed from the complexion alone to be one of malaria. It proved to be one of typhoid fever (positive Widal; negative for malarial organisms). Here the fever had been preceded by anemia due to prolonged lactation.

Finally, as to subicteric and melanotic types. The former are not rare. Indeed, considering the great hemolysis constant in malaria,

one is astonished that the bilious hue is not a constant also. Researches have convinced the writer that the color of the skin in malaria bears no relation whatever to the degree of hemolysis in a given case. Two clinical cases were cited: A man of 44 with comatose pernicious malaria, mortal pallor, no trace of icterus, 30 per cent hemoglobin, no biliary pigments in the blood serum; a man of 29 with estivo-autumnal fever, subicteric hue, 55 per cent hemoglobin, blood serum of canary-yellow color, and positive reaction for bile pigment. In these cases the icterus was in inverse proportion to the gravity of the disease.

As to the melanotic form, it is referred to by the older authorities, but a search of the recent literature has yielded only two doubtful reports. In one case there was a universal melodermia (Cardarelli, 1887). The other was a symmetrical pigmentation about the upper and lower joints, described by Moscato, 1895. In each instance the pigmentation was ascribed with doubtful propriety to malaria. However, even accepting these reports as accurate, the writer affirms that they describe the exception, not the rule. Melanotic pigment rarely localizes in the skin of the malarious patient. (J. S. T.)

Bass, C. C. **The standard treatment for malaria.** South. Med. Jour. April, 1921.

A standard treatment for malaria was adopted by the National Malaria Committee at a conference on the treatment of this disease. The treatment proposed is as follows:

"For the acute attack 10 grains of quinin sulphate by mouth three times a day for a period of at least three or four days, to be followed by 10 grains every night before retiring for a period of eight weeks. For infected persons not having acute symptoms at the time only the eight weeks' treatment is required.

"The proportionate doses for children are: Under 1 year, ½ grain; 1 year, 1 grain; 2 years, 2 grains; 3 and 4 years, 3 grains; 5, 6, and 7 years, 4 grains; 8, 9, and 10 years, 6 grains; 11, 12, 13, and 14 years, 8 grains; 15 years or older, 10 grains."

The object of the treatment is not only to relieve clinical symptoms, but to disinfect the patient in order to prevent relapse and transmission of the infection to others. Too little attention has been given in the past to this feature. The proportion of cases of malaria treated by physicians that are actually cured of the infection is ridiculously small. This is due largely to the inefficient methods of treatment employed. A standard method of treatment, if efficient, would tend at least to change this condition and considerably reduce the number of malaria carriers, potential sources of infection to others.

Quinin sulphate is the salt of quinine recommended. Other salts are no doubt equally effective when given in doses of corresponding quinine content. The sulphate is the salt with which most people are familiar. It is the standard commercial article and is as cheap as, if not cheaper than, the other salts, considering its quinin content. Since the treatment necessary to disinfect must be continued for a long time, it is desirable to select the kind of quinin which people are most likely to take. It is reasonable to suppose that the sulphate with which most people who live in malarious localities are familiar would be more likely to be taken than salts less well known.

The theoretical ground for the choice of some of the more soluble salts is probably not well taken, as there is considerable experimental evidence that they are not more rapidly absorbed than the sulphate. If such were the case it would be a disadvantage instead of an advantage, because what is wanted in malaria is continuous absorption and continuous presence of quinine in the blood over considerable periods of time. If, therefore, the supposition that the more soluble salts are more rapidly absorbed is correct, the less soluble sulphate would be preferable.

The minimum dose of quinine that will accomplish the desired result of a cure of the clinical symptoms in the great majority of cases has been determined from extensive practical experience to be three 10-grain doses daily for four days. This is effective and at the same time produces the minimum amount of discomfort commensurate with securing the desired results.

To disinfect the patient and prevent relapse a dosage of 10 grains daily, given at bedtime, has been found sufficient to produce results after observing several thousand cases.

Administration of quinine sulphate by mouth is preferred and recommended because of its simplicity and that it requires no special apparatus in the treatment. Intravenous administration has only one special indication—pernicious malaria where the patient's life is in danger and requires quinine in the blood stream at the earliest possible moment. Intramuscular administration has no place in the treatment of malaria. (J. J. O'M.)

PHYSIOLOGICAL CHEMISTRY.[1]

King, Jr., J. T., and Pearl, R. **Determination of the basal metabolism from the carbon dioxide elimination.** Bull. Johns Hopkins Hosp., Sept., 1921.

The authors propose a method "whereby carbon dioxide elimination may be used as an index to basal metabolism," the apparatus being "stable, simple, and relatively inexpensive." It was found

[1] Acknowledgment is tendered to "Chemical Abstracts" for much of the material in this section.

that the "carbon dioxide elimination seems to be at least as accurate and possibly a more accurate index to heat production than is oxygen consumption."

Advantages of the method are summarized as follows:

1. "The method is 'open.' This prevents danger of possibly respiratory infection, for which the 'closed methods' have been criticized."

2. "By weighing the carbon dioxide output one needs to make no corrections for temperature and barometric pressure, such as becomes necessary in using volumetric methods of oxygen consumption."

3. "The psychic effect upon the patient that accrues from this open method are as follows:

"A. He may be assured that he is breathing 'fresh' air.

"B. The moving spirometer and the buzzing fan, often part of the 'closed' apparatus, may form an annoyance to the patient."

The following table is given as a normal standard of carbon dioxide (grams per square meter of body surface, determined by the Du Bois formula) elimination:

Age.	Men.	Women.
15–20	14.03	12.75
20–30	12.98	11.95
30–40	12.86	11.85
40–50	12.52	11.74
50–60	12.21	11.37
60–70	11.86	11.05
70–80	11.53	10.71

The necessary apparatus comprises a balance, a suitable mask, and a tube connection to three jars (first and third contain 4-mesh calcium chloride; second contains soda-lime, the Wilson or Navy variety supplied by the Dewey and Almy Chemical Co., North Cambridge, Mass., being recommended), such as are used with the original Benedict portable apparatus. The balance may be an obstacle to general use of the method, inasmuch as it is preferably an inclosed large one capable of accommodating the large jars and giving weights to the centigram. (C. W. O. B.)

McCollum, E. V., Simmonds, N., and Parsons, H. T. **Supplementary values of the proteins.** Jour. Biological Chem. June, 1921.

In a series of five important articles the authors consider their experimental results concerning the supplementary values of the proteins or various foodstuffs—i. e., the values (biological values) of various protein combinations in meeting the nutritive needs of a

mammal—the rat. These values will depend upon the yields by each protein of those indispensable amino acids which are present in smallest amount.

The proteins tested were those from animal sources (milk, beef liver, beef kidney, and beef muscle), and from vegetable sources. The latter comprised cereals (wheat, barley, rye, maize, millet, and rolled oats), tubers (potatoes), and legumes (peas, soy beans, and navy beans). Proteins constituted 9 per cent of the food mixture, and were supplemented with respect to all other factors so as to make a satisfactory diet with the possible exception of the protein moiety. Eighteen per cent of protein of good quality (biological value), solely from liver, kidney, muscle, or brain was far above the plane of intake necessary for normal growth. Protein fed at the critical level of 9 per cent was found to give normal growth, high fertility, and low infant mortality, if of excellent quality; if of good biological value, normal growth and possibly fair fertility; less than 9 per cent did not give normal growth.

Under these conditions it was found that glandular organs or muscle as the sole source of nitrogen in the food failed to secure normal growth. The limiting factors for animal tissues are lack of calcium and sodium chloride, and, with muscle, fat-soluble A. Given alone their value is about equivalent to wheat, which result is surprising, inasmuch as it has always been accepted as fact that animal proteins had higher biological values. This was Thomas's conclusion, but the authors consider that he made it upon faulty premises, and that his results really "represent digestibility and absorbability rather than biological value for transformation into body tissue." Animal tissues are of much greater value as supplements to cereals than are legumes or other cereals with few exceptions. They are remarkably effective in enhancing the quality of protein in a diet of mainly vegetable products. Owing to their deficiencies, however, especially in the case of muscle, they will not supplement a cereal, tuber, and fleshy-root diet so as to make it highly satisfactory. Liver, kidney, and muscle are about equivalent as supplements for wheat, are effective with legumes (kidney and navy beans best), but less so than with cereals, and their combination with cereals is better than the use of any one alone. Surprising as it may seem, milk was not as effective with seeds and tubers as were liver, kidney, or muscle, despite the fact that it will effectively remedy their deficiencies in calcium and fat-soluble A. Boiling or pasteurization of milk destroys the thermolabile water-soluble C, as will also the cooking of glandular organs.

When two-thirds of the protein is from seeds and one-third from kidney, the biological value of the combination is in the following

order, the best being placed first: Wheat, barley, rye, oat, maize, soy bean, pea, navy bean. For muscle: Wheat, oat, barley, maize, pea, navy bean, soy bean. For liver: Barley, rye, wheat, oat, maize.

Cereals (deficient in inorganic substances) did not enhance each other to any great extent, with the notable exception of rye and flaxseed. In certain instances cereal and legume combinations improved the quality of the protein, wheat showing a decided supplementary value for peas and navy beans.

The legumes (deficient in inorganic substances) did not supplement each other, which may have been due to the low cystine content of all.

Potatoes slightly and uniformly supplemented cereals and legumes, but not as effectively as animal tissues. "The nitrogen of the potato is in great measure in the form of simple substances of nonprotein nature. These substances are evidently not of a character which supplements the proteins of milk to any marked extent. We have pointed out elsewhere that the nitrogen of the potato when fed as the sole source of this factor is not of so high a value as some have reported. . . ."

"The dietary properties of a substance can be fairly accurately predicted from a knowledge of their biological function." In general, foods having the same function, e. g., storage function in case of seeds, roots, and tubers, are not effective supplements. Liver and kidney "possess dietary properties as distinct from those of muscle tissue as leaves of plants do in contrast to the seeds."

The relative nutritive value of foods of great importance may be arranged according to the following list, the best being mentioned first: Beef kidney; wheat; milk, or beef liver; muscle (round steak), barley, or rye; maize, or oats; soy beans, navy beans, or peas. In connection with wheat, however, the value will probably vary with the variety, in analogy with the dough-forming qualities.

Low protein influences body conformation but little, and there is ready response to increased intake. Inorganic deficiencies, however, produce short and stocky forms, which proper diet will not correct.

Relative to toxic effects, "the evil effects often attributed to excessive protein consumption may now with some confidence be attributed in many instances to faults in the composition of the diet in factors other than protein." Liver, kidney, or muscle, even at planes of intake of 35 to 70 per cent, gave no distinct evidences of toxicity. Liver and kidney yield considerable amounts of purines and, ultimately, uric acid, and are doubtless contraindicated when there is interference with the excretion of uric acid or urates. With healthy persons, however, there seems to be little reason why they should not be eaten as adjuvants to the diet. Millet is not "a very wholesome

food grain," not by reason of lack of fat-soluble A, but probably on account of the presence of a toxic substance, thus corroborating the common belief in its injurious properties held among farmers in the Middle West. Faulty diet (lack of water-soluble B, or protein low in quantity or poor in biological value, even if it does not produce protein starvation) frequently produces abnormal psychological reactions, as evidenced in the maternal instinct, even leading to infanticide. Perversion of such a primal instinct would indicate even greater influence upon attributes less deeply ingrained, and this fact may have some significance relative to the psychoses of beriberi and pellagra.

"The evidence seems sufficient to warrant the conclusion that there are three deficiency diseases which occur in man as well as in animals"—namely, beriberi, scurvy, and xerophthalmia (keratomalacia). "There is much reason to suspect that certain eye conditions popularly referred to as night blindness and in the literature as hemeralopia may be, in part at least, due to lack of sufficient fat-soluble A. The widespread infections of the eyes seen in Egypt and elsewhere may have their origin in lowered vitality of the eye structures due to lack of the dietary factor, fat-soluble A, which favors the invasion of the eyes by microorganisms."

The authors tells how tests for biological values of foods may be rendered more sensitive by the use not only of the rate of growth, but also of other phenomena, thus enabling one to study the "twilight zone" of nutrition in which the vital powers of the organism are just below the optimum. "A variation of quality upward in one or another factor, as protein or salts, may so modify the early history of the experimental animals as to make a particular factor—e. g., fat-soluble A content—appear in one set of results to be adequate for the physiological needs of the animals, while a variation in the quality downward either in the protein or salts, such variation remaining at the same time well within physiological limits, may entirely change the deductions with respect to the value of the constant factor fat-soluble A. . . ." "Such experimental results as these show the fallacy of deductions such as have been made by Hess and Unger, who fed infants during several months on a diet somewhat low in fat-soluble A, but of excellent quality in other respects, and concluded that the factor fat-soluble A is not of great importance in practical human nutrition. Judgment on this matter must be based on a full appreciation of the difference between border-line malnutrition with its attendant grave dangers from infections or unfavorable reaction to any chance modification of the diet so as to reduce its quality in any way. . . .

"The rarity of reference to the relation of faulty diet to the general health of peoples in the writings of those who are now discussing

health problems shows that it is not at present accepted by many that there is any important relation of the food supply to well-being, except in extreme cases of one-sided diet in which the defects are sufficiently grave to induce the development of a 'deficiency' disease. The reason for this is easy to understand. Our standards of what constitutes wellness and illness, as well of what constitutes normal physical development, are relatively low. People are generally considered well until they admit that they are ill, or until they look so unwell as to attract attention. The difference between the average physical development of men and women, as contrasted with the best specimens in the community, is very great, yet we are accustomed to regard as normal many persons who are but poorly constituted physically.

"Malnutrition is painless and leads to susceptibility to other agencies which may induce discomfort. The sequence of events is not ordinarily appreciated and the cause therefore escapes notice. Low vitality, low resistance, and inefficiency, and a tendency to cumulative fatigue, are what we should expect in man to result from adherence to a faulty diet when the faults are of a lower order than would be necessary to bring about an attack of a 'deficiency' disease. Although a few leaders in the new movement for the betterment of the health condition of children are urging the importance of properly selected food, the idea is new and not generally appreciated. There is much reason to believe that one of the most important contributing factors in industrial fatigue is the low recuperative power that results from an unsatisfactorily selected food supply. The data regarding the animals described in this paper, all of which were subjected to diets which were faulty to a certain extent, afford striking evidence that such types of diet interfere with the completion of the life history in a normal manner. This is true, notwithstanding the fact that in some instances the faults were by no means marked. The extent to which the animals were injured and the manner in which they were effected, afford food for serious reflection concerning the similar experience of man and its probable causes.

"The results of our experimental studies on the rat have led us to an appreciation of the short-sightedness of the view that a diet is satisfactory if it is not sufficiently poor to cause the development of a 'deficiency' disease. Although the importance of a diet containing an abundance of milk and eggs has become generally accepted to have a distinct therapeutic value in the treatment of tuberculosis, it has not been widely appreciated that a similar diet should be very effective as a preventive of infection and of the flaring up of disease. . . .

"It is now recognized by students of nutrition that the cereal grains individually and collectively are incomplete foods. The war has taught through tragic experience that children can not be kept alive for a very long period on such a food supply, although the requisite calories and energy may be supplied. The history of scurvy furnishes numerous examples of the dangers attending the restriction of the diet of adults to cereal products, legume seeds, and meats. Nevertheless, statisticians and persons in charge of feeding large groups of people in armies, prisons, asylums, hospitals, and labor camps still in many instances show lack of appreciation of the dangers of limiting people to certain types of restricted diets. . . . We have come, as the results of much experience, to question whether the extension of the use of cereal grains in the diet of man has not already passed the limit of safety. At least it is more necessary now than formerly that the remaining components of the diet should be chosen with knowledge and care in order to correct the deficiencies of the cereal, tuber, and muscle-meat mixture, or the bread, potato, and meat type of diet which has become so prominent a feature of the nutrition of many American and European families at the present time. It has already been pointed out that the cereal grains, legume seeds, and muscle-tissue meats are too poor in calcium, sodium, chlorine, and fat-soluble A to meet the physiological requirements of a mammal. Mixtures of these in any variety are little, if any, better sources of the essential mineral elements or of fat-soluble A than are the individual foods themselves. . . .

"The land yields calories and protein in greatest abundance when farmed to cereals and leguminous plants, rather than when used for the production of milk and meat. This type of farming has therefore been encouraged, and wheat and maize production has been stimulated year by year to higher and higher levels until the world's capacity has nearly been reached in this respect. This great consumption of grains has changed the character of the diet profoundly from what it has ever been before in human history. The national dietetic sin of America and many parts of Europe has grown to be a close adherence to a meat, bread, and potato diet, or other foods which have similar dietetic properties. When it is remembered that the cereal grains are now all but universally decorticated and degerminated for the purpose of producing products which can be kept without commercial hazard, and that these are decidedly poorer in their dietary properties than are the seeds from which they are milled, the situation can readily be appreciated. The diet of cereals, muscle-tissue meats, and tubers (the bread, meat, and potato type) is not satisfactory for the nutrition of man or animals, and is distinctly poorer quality when highly milled products are used in abundance.

"We wish to emphasize in connection with this study of the manner in which the cereal grains supplement, or rather fail to supplement, the proteins of other cereal grains and legume seeds, the *fact that the widespread use of this class of foods represents an innovation in man's diet, and one which is not for the best.* The cereals may well be used as articles of human food, but it is wiser to utilize more of the land for the extension of the dairy industry in order to increase the supply of milk and other dairy products than to seek to extend as far as possible the production of crops which yield the greatest returns in such food units as the chemist has long recognized but which fall short of the requirements of mammals in respects which we have but recently been able to appreciate. . . . We can not agree with Daniels and Nichols that the consumption of legume seeds, such as the soy bean, should be increased. It is much better to use these seeds for the feeding of dairy cows, for their deficiencies can be made good by the latter through the consumption of forage plants and used as a source of milk formation. Milk forms the most satisfactory corrective food to make good the deficiencies of the cereal, muscle meat, and tuber diet now in such widespread use. . . .

"There are many who believe that if the diet affords sufficient calories and considerable variety satisfactory nutrition will be assured. This may be far from true. So long as the selection does not include a variety of types of foods unlike in dietary values variety does not insure safety in any great degree. No matter how many cereals, tubers, and muscle meats, such as steak, ham, chops, roasts, etc., may be taken, the diet will prove to be inadequate. . . . The substitution at frequent intervals of ham for chops will not tend to insure safety in nutrition. So large a part of the food supply of man in the temperate and warmer regions of the world is derived from cereals and other seed grains, tubers, and edible roots that in seeking variety in food attention should be fixed upon the importance of milk and the leafy vegetables suitable for greens, salads, etc., since these are so constituted as to correct the deficiencies of cereals, tubers, and roots. . . .

"It has also been shown that milk and leafy vegetables occupy a unique place among our ordinary foodstuffs in that they are the only foods regularly consumed in moderate quantities which are of a nature to correct the mineral deficiencies of cereals, legume seeds, tubers, and fleshy roots, or to adequately supplement them with respect to fat-soluble A. It is well known from laboratory experiments on animals, as well as from agricultural experience, that milk proteins tend to enhance the value of vegetable proteins generally. . . . Fresh fruits and uncooked salad vegetables have a unique place in the diet as sources of the antiscorbutic factor water-soluble C."

The diet of the primitive Eskimo of Alaska (muscle and fat especially, with blood and its sodium chloride, glandular organs, bone marrow, and the chewed softer parts of bones) was very rich in protein and fairly satisfactory otherwise. At present in northern Alaska there is a general cereal and muscle diet (cereal grain products, canned foods, muscle), and teeth are poorly calcified, often carious.

The diet of carnivorous animals closely resembles that of the primitive Eskimo, is satisfactory, and will supply the needs of the rat. But place this animal on a cereal, tuber, and muscle-meat diet, i. e., one deficient in inorganic substances, among other things, and one produces most profound differences in extent of calcification and density of deposited calcium phosphate.

Prior to 1850 the natives of Iceland subsisted essentially upon a high protein diet (milk, mutton, fish, fowl, carrageen moss, and sometimes eggs, potatoes, or turnips). Their teeth and general health were excellent. Later cereals and sugar were regularly imported, and carious teeth are to-day as common as in some parts of the United States.

In the United States we have essentially a high protein diet (muscle, fish, poultry, eggs, cereals, and legumes)—the "bread, meat, and potato diet." It is only exceptionally completely supplemented by other constituents, and is the cause of the deterioration of our teeth.

The diet in Labrador and Newfoundland is practically wheat flour, molasses, fish (livers not used), meats, tea, and raisins. Beriberi and scurvy are common, night blindness frequent, and xerophthalmia occurs. All of these diseases would probably be eradicated by the use of fish livers.

Cod-liver oil, with its high content of fat-soluble A, is prophylactic and curative in cases of xerophthalmia and night blindness.

Relative to the vitamines, good sources for fat-soluble A are liver (abundant), kidney (abundant), cod-liver oil, and fat from glandular organs (pig kidney and cod testicle), but lard contains no appreciable amount. Milk and butter fat are also sources, while muscle is a very poor one. Millet contains more than wheat, peas, or beans, while oats have the least of the cereal grains. Some varieties of yellow maize contain more than certain white varieties, but the differences have probably been exaggerated. The white potato is an inadequate source.

Water-soluble B is abundant in liver and kidney, but muscle is a very poor source.

The thermolabile water-soluble C is abundant in fresh raw liver and kidney, fresh fruit and uncooked salad vegetables, but muscle contains but very little. "This factor is essential in the nutrition of

man, monkey, and guinea pig, but need not be furnished by the diet of the rat or prairie dog, since they are apparently able to synthesize it." (C. W. O. B.)

EDDY, W. H., HEFT, H. L., STEVENSON, H. C., AND JOHNSON, R. **Studies in the vitamine content.** Jour. Biological Chem., July 1921.

The authors conclude that in its present state the yeast test (stimulant effect of extract of material upon growth of yeast) "is distinctly unreliable as a quantitative measure of vitamine content," and that "until a basal medium is worked out that provides an optimum of all the factors except vitamine B the test must be considered of little value in the estimation of true vitamine content." (C. W. O. B.)

BAILEY, C. V. **A sampling bottle for gas analysis.** Jour. Biological Chem., July 1921.

A very convenient appliance "for readily collecting and holding samples of gas and for transferring them to a gas-analyzing burette without danger of dilution or loss of mercury" is described. Capacity of 60 cc. obtainable from C. M. Sorensen Co., 177 East Eighty-seventh Street, New York City. (C. W. O. B.)

STEENBOCK, H., SELL, M. T., AND BOUTWELL, P. W. **Fat-soluble vitamine.** Jour. Biological Chem., July 1921.

"Seeds as a class are apparently never as rich in the fat-soluble vitamine as the leafy parts of plants." Millet is not a source of special prominence, and yields less uniform success than yellow Indian corn with which "those varieties carrying yellow pigment are rich in the vitamine while those free from it contain very little." Experiments upon the rat with six samples of ripe peas showed that "those of a green color, also carrying considerable yellow pigment, were far richer in their fat-soluble vitamine content than yellow peas which contained much less yellow pigment." (C. W. O. B.)

STEHLE, R. L., AND MCCARTHY, A. C. **The effect of hydrochloric acid ingestion upon the composition of the urine in man.** Jour. Biological Chem., July 1921.

It was found to cause an increased excretion of potassium, sodium, ammonia, phosphoric acid, and hydrogen ions. (C. W. O. B.)

EYE, EAR, NOSE, AND THROAT.

O'Malley, J. F. **Conditions predisposing to hemorrhage in tonsil operations.** Brit. Med. Jour. September, 17, 1921.

In a series of 1,510 consecutive cases of tonsil operations on patients under 14 years of age the average blood loss was between 2½ and 4 ounces, while in a smaller group of cases over 14 years the loss was from 3½ to 5 ounces. Complete tonsillectomy with the guillotine was done under general anesthesia. Hemorrhage beyond this amount can be considered unusual and due to either some anatomical, pathological, or surgical condition or to some disturbance in the normal clotting of the blood.

The following scheme considers a majority of the conditions which, being present prior to or at the time of operation, may increase the amount of blood usually lost from a properly performed operation.

ANATOMICAL.

General.—Age; sex; short-necked, florid patients; menstruation; menopause; early pregnancy.

Local.—1. Large tonsils.

2. Abnormal vessels. (*a*) Concealed type: Large artery entering tonsil instead of previously dividing. (*b*) Visible type: Pulsating and tortuous ascending pharyngeal, internal carotid, and external carotid; abnormal large superficial veins; angioma of fauces.

PATHOLOGICAL.

Local.—1. Inflammation: Acute tonsillitis; chronic tonsillitis and pharyngitis.

2. Ulcerations: Syphilitic, tuberculous, Vincent's angina, actinomycosis.

3. Fibrosis of tonsil: Due to recurring tonsillitis or to recurring quinsies and abscess (erosion of vessels; adhesions).

4. Innocent tumors: Lymphadenoma.

5. Malignant disease: Sarcoma; epithelioma; endothelioma.

General.—1. Blood states. (*a*) Congenital: Hemophilia. (*b*) Acquired: Purpura; temporary defective clotting due to infective diseases. (*c*) Anemias (especially secondary). (*d*) Leukemia.

2. Blood vessel changes. (*a*) Arteriosclerosis: Syphilis; nephritis; alcoholism; athletics. (*b*) Aneurysm: Internal carotid; external carotid; tonsil vessel (erosion of wall due to abscess).

3. Other conditions. (*a*) Exophthalmic goitre. (*b*) Heart disease.

Among the various prophylactic measures used are calcium lactate, horse serum, human serum, hemoplastin, coagulose, and pituitrin to increase the coagulability of the blood, and adrenalin and pituitrin, which act as vasomotor constrictors. The author's ideal treatment for cases predisposed to excessive bleeding consists of giving two doses of horse serum or hemoplastin at intervals of 48 hours by hypodermic, the last being two days before the operation, and just

prior to the latter procedure (about half an hour) inject 15 minims of pituitrin. The coagulation effect of both and the vasoconstrictor action of the latter are thus obtained. (L. H. C.)

KELLY, A. B. **Statistical record of serious and fatal hemorrhage following operation on the tonsil.** Brit. Med. Jour. September 17, 1921.

After submitting numerous statistics, the author concludes that deductions on the basis of these would be unreliable; they prove, however, that the commonly accepted operations for the removal of tonsils performed in a proper manner on suitable patients are very infrequently followed by serious hemorrhage. Tonsillectomy in children is rarely accompanied by noteworthy bleeding, and practically never requires special measures for its control. Severe and persistent hemorrhage is more commonly seen in adults who have suffered from quinsy. In the majority of these the bleeding ceases spontaneously, but often only after a considerable loss of blood. Stitching the pillars has been resorted to at one time or another by most laryngologists, but recourse to special treatment has rarely been found necessary. (L. H. C.)

NOTES AND COMMENTS.

THE PROGRESS OF THE TENTH REVISION OF THE UNITED STATES PHARMACOPŒIA.

A report of progress of the tenth revision of the United States Pharmacopœia has been issued by the General Committee on Revision, in which it is stated that the following new articles, 27 in number, have been recommended for the U. S. P. X., it being understood that several in the list may not be finally admitted because of legal or other complications:

Acetyl-salicylic acid.
Acetyltannin (tannigen).
Carbromal.
Adrenalin.
Solution of adrenalin chloride.
Albumen tannate.
Argyrol.
Arsphenamine.
Neo-arsphenamine.
Barbital.
Barbital-sodium.
Barium sulphate.
Benzyl benzoate.
A 20 per cent preparation of benzyl benzoate.
Dichloramine-T.
Phenobarbital.
Oleum chaulmoograe.
Procaine hydrochloride.
Protargol.
Sodium diphosphate (NaH_2PO_4).
Dextrose (chemically pure).
Anesthesin.
Dakin's solution.
Chloramine-T.
Sajodin or similar type.
Pyramidon.
Chlorinated paraffin (for dichloramine-T).

Referring to trade-marked or patented chemicals proposed for admission, it is gratifying to announce that the Winthrop Chemical Co. (Inc.), which controls several of these, have assured the chairman that they should be pleased at their inclusion in the Pharmacopœia under appropriate conditions.

The conditions suggested are the use of descriptive chemical names, omitting the trade-marked titles.

For instance, "luminal," if admitted, might be called "phenobarbital," with the synonym "phenylethylmanolyl-urea." The title of "adalin" might be "carbromal" and the synonym "brom-diethylacetyl-carbamide," and for "veronal" the title "barbital," with the synonym "diothylbarbituric acid." The descriptive titles "phenobarbital," "carbromal," and "barbital" were all dedicated to the public use during the war and might properly find their place in the Pharmacopœia.

Where this policy is followed the owners of trade-marks would use them as an indication of their special brand and thus retain valu-

able rights, while other manufacturers who secure licenses to make the product would likely adopt a special name but would also use the Pharmacopœial title. This policy, where accepted by chemical firms is much broader and more liberal than that usually taken and will no doubt, be heartily approved by the medical and pharmaceutical professions.

The chemical foundation now controlling the licenses for a number of the manufacturing processes seized during the war, under the Enemy Trade Division of the Federal Trade Commission, has also expressed the opinion that there was no objection to the use in the Pharmacopœia of such titles as arsphenamine and neo-arsphenamine also barbital, procaine, and cinchophen.

It will probably be desirable to include in the U. S. P. introductory notices a statement to the effect that since existing patents are involved in the manufacture of certain official products (listing these) a license from the owner of the patent is required for their manufacture.

The subcommittee on scope recommends that the following articles official in the United States Pharmacopœia IX, be not admitted to the United States Pharmacopœia X:

Acidum gallicum.
Acidum hydrobromicum dilutum.
Acidum hydrocyanicum dilutum.
Acidum hypophosphorosum dilutum.
Acidum nitrohydrochloricum.
Acidum nitrohydrochloricum dilutum.
Aethylis carbamas.
Alumini hydroxidum.
Ammonii iodidum.
Ammonii salicylas.
Ammonii valeras.
Amygdala dulcis.
Anisum.
Aqua rosae.
Aqua aurantii florum.
Argenti oxidum.
Arnica.
Aspidosperma.
Auri et sodii chloridum.
Bismuthi betanaphtholas.
Bismuthi et ammonii citras.
Bismuthi subsalicylas.
Bromoformum.
Caffeina citrata.
Caffeina citrata effervescens.
Calcii glycerophosphas.
Calcii hypophosphis.
Calcii sulphidum crudum.
Camphora monobromata.
Cerii oxalas.
Chondrus.
Cimificuga.
Cinchoninae sulphas.
Copaiba.
Coraandrum.
Diacetylmorphina.
Diacetylmorphinae hydrochloridum.
Diastasum.
Ferri et quininae citras.
Fluidextractum sarsaparillæ compositum.
Foeniculum.
Frangula.
Guaiacum.
Guarana.
Humulus.
Hydrargyri oxidum rubrum.
Hydrastina.
Hydrastininae hydrochloridum.
Lactucarium.
Liquor sodii arsenatis.
Lithii bromidum.
Lithii carbonas.
Lithii citras.
Maltum.
Mangani dioxidum praecipitatum.
Matricaria.
Mezereum.

Morphina.
Moschus.
Oleoresina petroselini.
Oleoresina pineris.
Oleoresina zingiberis.
Oleum cubebae.
Oleum pimentae.
Oleum thymi.
Petroselinum.
Physostigma.
Pilocarpus.
Piper.
Potassii hypophosphis.
Pyrethrum.
Quininae salicylas.
Rabal.
Sanguinaria.
Sarsaparilla.
Sassafras.
Sinapis alba.
Sodii arsenas.
Sodii arsenas exsiccatua.
Sodii glycerophosphas.
Sodii hypophosphis.
Sodii perboras.
Sodii phenolsulphonas.
Sparteinae sulphas.
Spigelia.
Staphisagria.
Strontii bromidum.
Strontii iodidum.
Strychnina.
Sumbul.
Syrupus calcii lactophosphatis.
Syrupus hypophosphitum.
Syrupus sarsaparillae compositus.
Taraxacum.
Triticum.
Uranii nitras.
Veratrina.
Viburnum prunifolium.
Xanthoxylum.
Zinci carbonas praecipitatus.
Zinci phenolsulphonas.
Zinci valeras.

Metric abbreviations.—The committee of revision adopted at its first meeting the abbreviation "cc" to replace "mil" for liquid metric measure. The Bureau of Standards would prefer the abbreviation "ml," but object, with many others, to "mil" and prefer the adopted abbreviation "cc" if the committee will not accept "ml."

The spelling "gram" has also been adopted to replace the former "gramme," but the old abbreviation "Gm." had been retained. There has been some criticism in the committee of the evident discrepancy in these abbreviations, the "cc" being neither capitalized nor written with a period, the "Gm." being both capitalized and followed by a period. The Bureau of Standards have adopted the letter "g" without period or capitalization as the abbreviation for "gram," but this is obviously unfit for pharmacopœial use, since it would be constantly misunderstood to mean "grain," an amount representing less than one-fifteenth as much. The abbreviation "gm." is equally objectionable because of its possible confusion with the abbreviation "grn." for "grain," so that the abbreviation "Gm." seems alone acceptable for medical and pharmaceutical use.

Preparation of manuscript.—As the revision has progressed, a plan has developed which promises excellent results. When the subcommittee has completed its study of an article and submitted it through the general chairman to the consideration of the executive committee and the new comments received have been given the necessary study, the text is then carefully edited. This new text, proposed as the form for the United States Pharmacopœia, is then placed before

the general committee in duplicate, one set to be returned within two weeks. The members of the committee are requested to read this copy with the same degree of care heretofore given "galley proof," considering first the scientific facts presented, but also form, English construction, punctuation, typographical errors, or any other feature presented. It is believed that this plan will eliminate most of the corrections when texts are placed before the committee in type and thus reduce the time and expense involved.

About 50 organic chemical texts have been placed before the committee in this form and 50 more are ready. The response has been most gratifying, about 40 of the members having returned proofs, many offering valuable suggestions.

The next step will be a published abstract of the changes proposed in texts which have reached this stage of revision, and only when texts have passed through this complete course can the final manuscript be made up.

Date of appearance for the next United States Pharmacopœia.—For several decades there has been strong pressure brought upon the chairman of the committee of revision to fix a definite date for the appearance of the new book. After the very successful conference of the committee in Philadelphia last July one of the pharmaceutical journals predicted the appearance of the United States Pharmacopœia X in late 1923.

Those who have had experience in pharmacopœial revision know that the fixing of a definite date for its appearance is a mistake. First, because, if ample time is given after the book appears before the new standards are enforced, no interest suffers by withholding even a prediction of the time for its publication; and, secondly, because no one can foresee the complications and delays which may arise where so large a committee are working on a voluntary basis, and a failure to meet a promise would only bring criticism, embarrassment, and disappointment to all.

The chairman and committee ask that those interested in the new revision accept the assurance that an earnest effort is being made to complete the new book as rapidly as is consistent with a thorough and creditable revision and that the proposed changes, when published, will of themselves be a fair indication of the progress of revision. Furthermore, it must be remembered that the printing of a book like the Pharmacopœia, with proof reading by a large committee alone, requires at least a year for its completion.

In connection with the study of the practical value of vaccine in the prevention of pneumonia now being undertaken in the Army, the

following suggestions have been submitted for publication in the Medico-Military Review. It is to be understood very clearly that hey are merely suggestions, and their main purpose is to stimulate hought and possibly to be of some aid to the individual in planning is local study.

Needless to say, epidemiological observations at their best are far rom being exact, and their value is dependent altogether upon the kill and comprehensiveness with which they are carried out. In nany instances, however, when carefully made, they have been of mmense value and actually have pointed the way to the determina- ion of the essential causes of disease and the methods of transmis- ion. The epidemiological observations of Carlos Finley in 1881 uggested that yellow fever was transmitted by the mosquito, and his theory was verified 20 years later by the brilliant experimental tudies of Walter Reed and his coworkers.

The principal object of an epidemiological study is the collection f data on the prevalence of disease in the various groups or units f a population and the investigation of factors that may account or an increased incidence in one group and a low rate in another. The character and scope of the studies undertaken are dependent pon the type of information desired. Such a study may concern tself with the analysis of mass statistics, having in view a determina- ion of the principal factors that may be concerned in the increase r decrease of disease rates; it may be limited to a consideration of he special factor or factors presumably related to the spread of a pecified disease, for example, the investigation of water and milk upplies to determine their connection with epidemics of typhoid ever in given localities.

The study may be limited to observations on the occurrence and pread of a given disease among persons to whom a specific prophy- ıctic vaccine has been administered and a comparison with the cor- esponding rates among unvaccinated control individuals contained ıithin the same basic group and exposed to the same environmental onditions. Studies of this nature were carried out when antityphoid accine was first introduced as a protective measure.

The study of the effect of prophylactic vaccine in the prevention f pneumonia falls in the category mentioned in the preceding para- raph. From a superficial consideration of the factors involved, if onclusions of value are to be reached, it is evident that the problem s beset with many difficulties. To be of value investigations of this haracter must be made on comparable groups. If one gives the ıatter thought, it is evident that it is not within the realms of possi- ility to eliminate all factors that are not comparable. With some orethought it is possible, however, to so arrange the group to be

vaccinated and the unvaccinated control group as to eliminate many noncomparable factors. For example, let us suppose that two regiments are available for voluntary vaccination to prevent pneumonia, one white regiment and one colored. It would not be wise to vaccinate the white regiment and use the colored regiment as an unvaccinated control, nor would the reverse procedure be appropriate. Experience has taught us that the incidence rate of pneumonia among colored soldiers is much higher than for white. Any results obtained by the method of procedure outlined above would not therefore be comparable. Every effort should be made to so plan the two groups—vaccinated and unvaccinated—that the environmental and other conditions are, so far as is possible, similar, and therefore comparable. Strictly speaking, the company (battery or troop) most nearly fulfills the necessary conditions from a practical point of view. In such units the environmental conditions at the mess are usually identical, the system and degree of ventilation are more nearly comparable, the individuals making up the unit are in general exposed to the same degree of contact one with another, and all are exposed to a comparable degree of atmospheric contamination. If possible, therefore, the groups for comparison should be drawn primarily from the company unit, one group in the company being vaccinated and the other individuals of the company serving as controls. This procedure is likely to give more trustworthy results than would be the case if a whole company were vaccinated and another company used as a control.

These general suggestions can be elaborated upon with reference to the various details. For instance, in an epidemiological study conducted in the Army it is at times desirable to take into consideration the length of service of the individual soldier. The recruit is often more susceptible to infection than is the trained man, and his immunity to crowd infections increases to a certain extent with length of service.

It is considered by many that the recruits drawn from rural districts are, in general, more susceptible to respiratory diseases than are the men received from urban communities. During the World War this was found particularly true of individuals who formerly resided in the rural districts of the South. The one notable exception has been found in the rural troops of the Pacific Northwest, who apparently are no more susceptible than are the men from the large cities of the East. In this respect a town of 2,500 or more inhabitants is considered to be an urban community.

The ability of the urban and the rural soldier to resist disease is not so noticeable after both types have been under military conditions for a few months. It is unlikely that this factor will greatly modify

ne spread of respiratory infections in the Army as constituted this inter, but, nevertheless, it should be considered whenever an epiemologic study is contemplated.

The primary factor in the development of a communicable disease ; the presence in the tissues of conditions which will permit the ultiplication of the invading organism. Anatomical and physiological defects of the respiratory tract or accessory structures may roduce an environment which will be favorable to the growth of athogenic organisms, and even be sufficient to overcome partially ny immunity resulting from vaccination. It would seem, therefore, iat the examination of the nose, throat, and sinuses of the vaccinated ndividuals and of the unvaccinated controls as well, would be a ighly desirable procedure where conditions are such as to render ork of this nature practicable. It would be necessary to examine oth groups in order that the findings in this respect might be comarable.

The administration of the antipneumonia vaccine during the past ew years has in some instances been followed by results which indiite that a beneficial effect was exerted upon the incidence of respirtory diseases other than pneumonia. It is highly desirable in the tudies to be conducted this year relative to the effect of antipneuonia vaccine that the incidence of such diseases as laryngitis, haryngitis, tonsilitis, bronchitis, coryza, etc., be noted (in addition) the pneumonias) in both the vaccinated and the unvaccinated con:ol groups.

The first step in a study of this kind should be the formation of a efinite working plan which should include in logical sequence all the ssential details of the contemplated work, particularly the nature f the data to be obtained and the methods of recording and reporting ame.

Having decided upon the scope of the investigation, the recording f the findings is of paramount importance. Various methods may e used for this purpose; perhaps the simplest for the medical officer ; that of placing pertinent facts upon the back of the card used to ecord the data pertaining to the administration of the vaccine (Form 2 M. D.). Here space is available for the notation of such points s length of service, urban or rural origin, nose and throat findings, tc. If a similar survey is made of the control group indvidual cards an be devised for this purpose. Special cards may be used for the ling of the data, and the value of these will depend upon the inenuity of the officer in charge of this portion of the work. Whatver recording system is used, the data should be as complete as posible under the circumstances, individual cards should be used, and

the cards should be so filed that the information contained thereon is readily accessible at all times for reference.

Having completed the study and obtained all possible data pertaining thereto, the next step is that of reporting the results, and here, unless thought and care are exercised, much of the value of the investigation may be lost. All facts should be reported and in such a form as to permit analysis by others and comparison with similar studies regarding the use of the vaccine at other stations. A full report of all raw data from any one station is of far greater importance than the local analysis of these data. Furthermore, the basic observations should be reported in such a manner that the effect produced by the different factors will be mathematically comparable. Perhaps the best method of compiling material for this purpose is by the use of the dichotomous table. In such a table practically all of the pertinent facts pertaining to the entire study, or to any of the groups, can be noted and each factor or group of factors can then be compared with all the others. If only one fact, or one small group of facts, is placed in a table and a number of such tables employed in order to report all of the observations pertaining to the study or to the group, it can be readily seen that a statistical comparison of the different data presented in the tables will often become impossible should the reader desire to investigate the subject from a viewpoint different from that taken by the reporting officer.

Having assembled the data in a form suitable for comparison, the larger tables can then be broken up into smaller tables, which will bring out the points which the reporting officer deems worthy of emphasis. The inclusion of all the data obtained is very important, even though some of it is considered nonessential by the writer of the report inasmuch as such information may become quite valuable when compared with similar data from other stations.

Reference on vaccination against pneumonia, American literature

Cecil, R. L., & Austin, J. H., Jur. Exp. Med., 1918, 28, 19.
Cecil, R. L., & Vaughan, H. F., Jour. Exp. Med., 1919, 29, 457.
Scholly & Park, Jour. Immumology, January, 1921.
Jordan, Edwin O., & Sharp, W. B., Jour. Inf. Dis., 1921, 28, 357.
Duckwall, Military Surgeon, 1920.
McGuire, Cox & Nourse, Mil. Surgeon, 1921, 49, 559.

EXPERIMENTAL WORK.

Cecil, R. L., & Blake, F. G., Jour. Exp. Med., 1919, 31, 519.
Cecil, R. L., & Steffin, G. I., Jour. Exp. Med., 1921, 34, 245.
Wadsworth, A. B., Jour. Immunology, 1920, 5, 429.

"Of the lore relating to the old hospitals and medical societies of London, Sir D'Arcy Power is a master; as his recent note on the

bibliography of three sixteenth-century English books connected with London hospitals is published in The Library (1921, ii, 73) and might otherwise miss the attention it deserves from colleagues, a brief reference to its scope is desirable. His paper, which was read three works of a bygone day. The first is "The Order of the Hos- before the Bibliographical Society, throws light on the history of pitalls of K. Henry the viiith and K. Edward vith, viz., St. Bartholomew's, Christ's Bridewell, St. Thomas's." It is in block letter, without the name or place of the printer. It bears the date 1557, but as the result of much research Sir D'Arcy Power concludes that there was no edition in that year, and that the book was first printed between 1690 and 1700 from a manuscript, possibly at the expense of Samuel Pepys, who, as Secretary to the Admiralty, was keenly interested in the welfare of officers belonging to the King's ships. The reason for the belated printing of "The order" was a determined effort of the Court of Aldermen in 1681 to regain their ancient jurisdiction over the four Royal Hospitals, which had practically lapsed from disuse. In his second bibliographical study on "A profitable treatise of the anatomie of man's body: compyled by that excellent chirurgion Thomas Vicary," Sir D'Arcy Power supplements the late Dr. J. F. Payne's critical examination (vide British Medical Journal, 1896, i, January 25th), which conclusively proved that this work was an abridgement of a manuscript by an unknown English surgeon in 1392; Sir D'Arcy also shows that his predecessor at St. Bartholomew's was no purloiner of other men's brains, but that the Anatomie was issued originally as part of a scheme to go back to old writers at a time when surgery was just beginning to take a new lease of life after the dead period of the Wars of the Roses. The third work, "The Ordre of the Hospital of S. Bartholomewes in West-Smythfielde in London," issued in 1552 in order to counteract an outcry against the governors, is described, with interesting extracts from its provisions, one of which directed that an unbroken record should be kept in the form of a repertory, a book of survey, a book of accounts, and a journal, and thus rendered possible Sir Norman Moore's recent monumental history of St. Bartholomew's Hospital." (The British Medical Journal, Oct. 15, 1921.)

In the Scientific American Monthly for July, 1921, Harvey V. Elledge and Alice L. Wakefield discuss the removal of stains from wash goods. This article was originally written for laundry owners and is accompanied by a "procedure chart," which tells at a glance what reagent to use for removing the various stains in the washing of cotton, linen, wool, and silk.

The writers recommend the following reagents for the removal of stains:

Acids.	Alkalies.	Oxidizing reagents.	Reducing reagents.	Solvents.
Oxalic. Hydrochloric. Acetic.	Caustic soda. Soda ash. Ammonia. Potassium-cyanide.	Javelle water. Hydrogen dioxide. Potassium permanganate. Sodium perborate.	Sodium bisulfite. Sodium bisulfite used with zinc. Sodium thiosulfate.	Ethyl alcohol. Amyl alcohol. Ethyl ether. Acetone. Aniline. Chloroform. Carbon tetrachloride. Carbon disulfide Benzine. Kerosene. Gasoline. Oleic acid.

The acids and alkalies and the oxidizing and reducing reagents are used as a rule, well diluted.

The various stains encountered in laundry work are removed as follows:

"*Albumin.*—The regular standard washing process includes a luke-warm first bath for the purpose of dissolving any albuminous materials that may be present.

"*Blood.*—The albuminous portion of this stain is removed in the first bath of luke-warm water; the stain proper, which is due to the hemoglobin or coloring matter of the blood, is removed in the bleach bath. If the fabric is of the kind that can not be treated with Javelle water, the stain may be treated with hydrogen dioxide.

"*Bluing.*—Bluing is of three kinds—ultramarine blue, that gives the desired color by depositing small insoluble particles of blue on the fabric; Prussian blue, that dyes the fabric with a soluble dye; and aniline blue, that dyes the fabric with an insoluble dye. Ultramarine blue, which only gives trouble by being used too heavily, may be removed by simple washing; Prussian blue, which in an alkaline bath is changed to iron oxide and gives a rust stain, has to be treated with oxalic acid solution. The aniline blues, if used too freely, dye the fabric permanently as far as the ordinary solvent water is concerned and must be removed by treatment with oxidizing or reducing agents, according to the nature of the dye used. Javelle water, or potassium permanganate solution, is used to oxidize these blues on cotton or linen fabrics, while potassium permanganate solution or hydrogen dioxide is used on silk and wool. Sodium bisulfite solution and zinc may be used on both the animal and vegetable fibers as a reducing agent. The potassium permanganate solution treatment is not complete in itself, as it leaves a brown stain of manganese

dioxide in the cloth, which must be removed by treatment with oxalic-acid solution. If it is found necessary to repeat the treatment, the excess oxalic acid should be washed from the fabric before more permanganate solution is applied. It is always well to observe the precaution of rinsing from the fabric any excess of solution when two solutions are alternated, because the excess of solution present reacts to neutralize the effect of the other solution in a manner that has no effect in the removal of the stain. There is no need for such useless reactions.

"*Cocoa and chocolate.*—These stains occur in most cases on white table linens and when too deep to be removed by the water and soap are removed by the bleach bath in the ordinary laundry way.

"*Coffee.*—Javelle water, applied in the bleach bath, removes this stain effectively.

"*Cream and ice cream.*—The principal ingredient that causes trouble in this type of stains is the butter fat present. When this is removed with hot water and soap, the stain is usually gone completely. In the case of an ice cream that has fresh fruit juice or a food die present as coloring matter the stain will be removed by Javelle water.

"*Dyes.*—The treatment for a dye stain has always to be determined by a few tests on some portion of the stained fabric. The first trial may be made with Javelle water; then with permanganate solution, then with sodium bisulfite solution and zinc. The kind of material involved and the dye itself have to be taken into consideration for the successful treatment of this type of a stain. The removal of hat dyes is facilitated by treatment with 95 per cent ethyl alcohol, in which the greater portion of the dye is soluble. A residual stain may have to be treated with one of the oxidizing or reducing agents.

"*Egg.*—This stain is partly albuminous, partly fatty, and in most cases will be removed by a formula that includes a lukewarm first bath and hot suds.

"*Fruit.*—Fruit stains can readily be removed by treatment with Javelle water.

"*Grass.*—This stain is also removed from cotton and linen by treatment with Javelle water. Silks and wools are treated with a mixture of equal parts of ethyl alcohol and ethyl ether. This is a solvent for the green dye present in grass.

"*Grease.*—The average grease stain is removed in the standard washing process. Any stain that survives this treatment may be softened with oleic acid and lard and washed in a hot solution of soda ash. If the grease has contained a mineral staining agent like iron or some type of dyestuff, it can be treated specially, as described under these headings. The best treatment to be accorded to silks and wools is with one of the many grease solvents. . . . The solu-

bilities of the different types of grease vary with the different solvents, and it is often necessary to experiment with several solvents before the most efficacious one is found.

"*Gum or resin.*—The type of the gum or resin decides the solvent that should be used. Common chewing gum is soluble in carbon tetrachloride; varnish is soluble in alcohol; resins are soluble in ether, alcohol, and turpentine, the source of the resin determining which solvent is best. Since there is no way to decide which resin is present, the method of trial and error must be applied to discover which solvent is to be used.

"*Ink.*—Iron inks are best removed by treatment with warm oxalic acid. If such treatment does not remove the stain completely, it is possible that the ink has been a mixture of iron ink and an aniline dye, in which case a second treatment with Javelle water is necessary. India ink and printers' ink are both suspensions of carbon in a gum-like medium, and should be removed in the regular laundering process. If such treatment is not effective, the stain may be loosened with lard and laundered again. Silver-nitrate inks have to be treated with sodium thiosulfate or with Javelle water. Javelle water converts the silver to an insoluble, colorless salt that has to be removed by treatment with dilute ammonia water. If this precaution is not taken, the silver may again oxidize to the colored salt and the stain reappear. Indelible pencils contain both graphite and an aniline dye; the dye can be removed by treatment with Javelle water, while the graphite will be washed away mechanically.

"*Iron.*—The specific treatment for iron stains is warm oxalic-acid solution.

"*Leather.*—Javelle water has been found to remove these stains from the cotton and linen fabrics, but in the case of silks and wools the stain is permanent.

"*Medicines.*—The medicines containing organic materials are usually removed in the regular laundry process; any stain surviving this treatment can be treated with Javelle water. The medicines containing salts of the heavy metals, like iron, silver, etc., may be treated with potassium cyanide. The cyanides of these metals are water soluble and are removed by means of this solvent after conversion has taken place.

"*Mildew.*—These stains are usually removed in the standard washing process, but heavy stains may have to be treated alternately with Javelle water and oxalic acid.

"*Mud.*—The mud itself is removed in the regular water washing, but a residual stain of iron is often encountered. This is treated, as all iron stains are, with warm oxalic acid.

"*Paint and varnish.*—These stains are best removed before laundering. They may be loosened by treatment with oleic acid and

hen laundered, or they may be treated with one of the solvents that are given in the table of reagents. The character of paint determines the treatment applied. Paints are composed of some vehicle and a pigment; the vehicle hardens or sets by the evaporation of some volatile ingredient or by the absorption of oxygen from the air, depending upon its chemical nature. The pigment can be removed mechanically after the vehicle carrying it is dissolved again.

"*Perspiration.*—This stain, being water borne, is usually removed by simple soap and water washing. If it is connected with the running of a dye, treatment for the dye must be applied. Colored goods that have been discolored by perspiration may sometimes be restored by sponging with weak acid or alkaline solutions.

"*Scorch.*—Scorched cotton or linen may be restored by treatment with Javelle water alternated with oxalic acid solution, provided the scorch has not completely destroyed some of the fabric. The same results may also be obtained with potassium permanganate and sodium bisulphite solutions. Light scorches on silk and wool may be partially restored by treatment with permanganate solution, but nothing can be done for heavy scorches on these fabrics.

"*Sirup.*—Sirup stains are usually removed in the standard washing process, because the medium of the stain, the sugar, is removed. If a fruit juice has been present, some stain may survive this process, but the treatment described under Fruit will remove it satisfactorily.

"*Tar and tarry.*—See treatment of paint.

"*Tea.*—Tea stains are usually removed in the washing process, but the occasional heavy one should be treated with Javelle water when it appears on cotton and linen and with potassium permanganate or hydrogen dioxide when it appears on silk or wool. This stain is in most cases the result of the tannin present in the tea, but in some cases is due to a dye that is added to give a darker color to the infusion.

"*Tobacco.*—The stains from tobacco are usually soluble in the standard washing process, but occasionally stains that require longer treatment are encountered. They may be treated with the oxidizing agents that are permissible with the type of fabric involved or they may, in case of the tarry residue from pipes, be treated with ethyl alcohol.

"*Tumeric.*—This is one of the seven dyes permitted by the United States pure-food law to be used in foodstuffs. Tumeric stains are usually to be removed by treatment with Javelle water or permanganate solution, but in cases that do not respond to this treatment amyl alcohol will be found effective.

"*Verdigris or copper stains.*—This stain, if not removed by the usual laundry process, has to be treated quite drastically with dilute hydrochloric acid. If only a weak solution of acid is used and care

is taken to remove all traces of it afterwards, no ill results will be noticed.

"*Walnut.*—This stain is one of the worst encountered on fabrics. It can usually be reduced to a light gray color on cotton and linen by treatment with Javelle water, but when on silk and wool no treatment can be recommended.

"*Wax.*—The most satisfactory method of removing waxes from fabrics is to place the spot on a piece of blotting paper and apply a warm iron. The heat liquefies the wax and the blotting paper absorbs it. If traces remain after this treatment, they may be sponged away with one of the organic solvents."

In conclusion it is appropriate to suggest that inspection of garments for stains be rigidly maintained in the receiving room. Many times stains are set in laundering, and offer a greater problem for removal than they otherwise would.

From the Lancet for July 23, 1921, we learn of the health of the French Mediterranean Fleet during the war. "The average complement was 33,788—the sick list 1,022, the deaths 5.17, and the invalidings 70 in every 1,000 men. Anemia, always prevalent amongst the engine-room staff, was more frequent during this period, as the ships were so constantly under steam. There were 12,115 cases of influenza in 1918, with 196 deaths. Antityphoid vaccination had an excellent effect, more conspicuous in the second half of the war. Prophylactic quinine diminished malaria. Tuberculosis attacked 4 per 1,000, and many cases called anemia may well have been early cases of tuberculosis. Venereal diseases were fewer than in peace, and were reduced by regulating prostitution or by compulsory prophylaxis. Arseniureted hydrogen, given off from the accumulators of submarines, caused trouble in 1916 particularly; 26 cases of disability from this cause occurred in one of these craft and 27 in another in that year. Many men were invalided home because they were simply worn out. The large cruisers are healthy; the large battleships have too little light and air, and they are overcrowded. Steel decks are unsatisfactory, being often too cold or too hot; they must be sheathed in noninflammable wood, as in England and Germany, or with linoleum, as in the United States. Larger steam radiators and heavier clothing are needed in cold climates. Douche baths have been fitted in some ships; but the sailors generally wash still in the bucket, long ago condemned. Disinfectors are not numerous enough; washing machines are asked for. Refrigerating chambers have made it unnecessary to carry live animals to sea, and this should be forbidden, as it causes nuisance."

The treatment of ophidismus, or poisoning due to the venom of a snake, may be divided into three stages:

1. Preventing the passage of the poison into the general circulation.

2. Neutralization of the poison at the site of the bite.

3. Neutralization of the poison that has reached the general circulation and the treatment of the special symptoms.

The majority of snake bites occur on the extremities, and the poison can be prevented from reaching the general circulation by the prompt application of a tourniquet on the proximal side of the wound. The blood and lymphatic vessels must be completely compressed; and to accomplish this, the tourniquet must be applied to the finger, arm, or thigh, where there is only one bone, and not to the forearm or leg.

The neutralization of the poison at the site of the bite depends upon the application of a chemical which will oxidize the venom. For this purpose potassium permanganate is the most effective. Following the application of the tourniquet a crucial incision, usually from one-eighth to one-fourth of an inch deep, is made at the site of the bite. The free bleeding serves to wash out a portion of the venom, and in the meantime an injection of a potassium permanganate solution (strength 1 to 3,000 or 1 to 5,000) is made with a hypodermic syringe to a depth of about one-half inch into the tissues surrounding the wound. If a vacuum cup or similar suction apparatus is available it would be well to apply it to the wound immediately after the crucial incision is made. This is followed by the application to the wound of a moist dressing of 1 to 5,000 potassium permanganate solution. The patient is placed in bed and carefully watched for the appearance of systematic symptoms. After about 20 or 30 minutes the tourniquet is loosened for a few seconds to allow the reestablishment of the circulation and to permit the escape into the general circulation of a small portion of any venom that may have remained unneutralized in the tissues of the affected part. The tourniquet is again tightened and allowed to remain in place for another 20 minutes. In the meantime any small amounts of unneutralized venom that have reached the general circulation are being eliminated from the body or bound by the tissues. After the tourniquet has been released the second time it may be discarded if no cardiac symptoms or signs of depression are apparent. When the bite occurs on the head or trunk, where a tourniquet can not be used, a stronger solution of potassium permanganate should be used in the same manner as outlined above.

The crystals of potassium permanganate should never be used in the wound when circumstances will permit the injection of the solution. This chemical is an active oxidizing agent and acts as such

upon the tissues as well as upon the venom. The use of the crystals is apt to be followed by severe necrosis and sloughing of the tissues. Should crystals have been used, the wound may later be washed out with a solution of oxalic acid, followed by sterile water. A further objection to the use of the crystals is that the drug in this form does not come in contact with the venom in the tissues as quickly as when in solution.

Antivenene serum should be used if available, particularly so if symptoms of systemic poisoning appear. It must be remembered, however, that each serum is specific against a single venom only. The Crotalus serum has a specific action upon the venom of the rattlesnake, but very little upon the venom of the *Ancistrodon piscivorous*, or moccasin snake.

The symptoms of cardiac involvement and depression are treated by stimulants and the application of warmth. (Medico-Military Review, July 1, 1921.)

We learn from the Lancet for September 3, 1921, that "before the war the publication of the annual health report of the German Navy was quite an event for students of naval hygiene, as it always had an article stating the more important hygienic advances made during the year in the ships, and no other such article was published elsewhere. These reports were always published late, not, like those of the British Admiralty, shortly after the end of the period, and the books for 1911–1914 have only recently come to hand; but they still have interest. In 1911–12 officers were again being accommodated aft in ships. Ozonization of the air continued to give satisfaction. Low-pressure steam was preferred for heating, and radiators were being fitted that could be easily cleaned to avoid the scorching of adhering dust, which causes smell. Electric heating was only employed in U-boats and in the Kaiser's suite in the new *Kaiser* battleship. Ice machines were being installed, and more refrigerating chambers permitted the men's food to be oftener fresh. When biscuit had to be issued it was made into puddings. Bakeries were to be on the upper deck in future. Men of the high-sea fleet at sea usually drank 5 ounces of beer, each of them, daily. Other drinks, like lemonade, Maggi's consommés, and cocoa, were offered them in the canteen to wean them from beer. The widespread but evil habit of cigarette smoking had spread so far that men took up on an average two cigarettes each per day, besides what they brought on board, but canteens sold chocolate, sweets, and buns cheap, which reduced tobacco sales. Nearly every man had a hand wash basin of his own, which he kept in his locker, consequently boils were fewer. Seamen used the stokers' bathroom one day a week, and the canvas

ath was constantly rigged on deck. Permanganate solution was egularly issued as a mouth wash; water was replacing oil in the parge pipes of urinals. A second X-ray apparatus was intended to e sent afloat, the first, in the *Deutschland*, having been a success. J-boat crews got four weeks' leave in the year (others probably fortnight). On hot stations men were allowed to sleep on deck, but hey must wear night clothing with cummerbunds, and fruit was arely allowed on board unless it could be dipped first in boiling vater to sterilize its exterior. Extra closets were being fitted in hips with dysentery cases to secure isolation and lessen infection. At Tsingtau vessels under refit were disinfected, cleaned, and aired. At the Litsun dispensary at Tsingtau there attended 4,254 Chinese ut-patients.

"In 1912–13 attention was being given to protect cabins and sick ays against heat and noise. Sick bays were to have a system of entilation of their own, with supply and exhaust, independent of he ship's system, to keep them sweet, though ports are closed in a eaway. Metal-filament lamps were being used to improve lighting. n the *Kaiser* class fresh water was piped to kitchens, bakeries, lava- ories, and sick bays; individual washbasins were being further is- ued and tiles for bathrooms were approved. The canvas bath was onstantly used. One ship fitted a steam hose, and in so doing was ble to begin swimming instruction in the bath in May and taught ar more boys. Cooks, bakers, stewards, and the barber had a daily ath by order. Such ratings as these got a short spell of physical rill daily. Dentists (contract) were coming in; the Province of chleswig subscribed a fund which enabled a dentist to be hired to eal with the teeth of men in the *Schleswig*. This was very practical harity, and the principle might well be followed in this country. uppose the city of Dublin annually sent money to the captain of H. M. S. *Dublin* to buy papers for the men and to help, for example, man who had lost teeth, by an accident not attributable to the serv- ce, to get a new set. At Tsingtau crews of ships under refit were odged in barracks ashore, an improvement often asked for on this ide of the North Sea and carried out at Bombay and Trincomalee. atrine paper was served out for the use of diarrhea cases which vere, or might be, infectious, and a bucket of cresol solution was put ear their closet for hand disinfection. The *Scharnhorst* in hot veather gave her men two baths a day, and her stokers at Tsingtau ot eight days' special leave by watches in a barracks up country or the good of their health. Bugs and cockroaches were being ener- etically pursued.

"1913–14: Newspaper reading and smoking in the water-closets nade it necessary that the seats should be altered and made less com-

fortable. Some of the men paid to have their teeth put right and bought tooth powder from the canteen. A formaline disinfector was fitted in all flagships. Hand washing after work and before meals and cleaning of teeth were officially pressed on the men. Atropin was found useful for seasickness. Men's blankets were inclosed in washable covers to keep them clean. Amongst the drinks provided to win the men away from beer the *Loreley* issued yoghourt, Bulgarian bacillus milk. This should have prevented indigestion. It was introduced by the medical officers; it is a pity the result is not stated."

NURSE CORPS.

DIABETES MELLITUS.

An article on the treatment of diabetes mellitus, by Dr. Murray Lyon and Dr. Jonathan Meakins, in the November Edinburg Review, has many points of interest to the nurse. "The old methods of treating this disease, which depended partly on drugs and partly on dieting, were on the whole rather unsatisfactory, and more success was attributed to the dietetic than to the drug measures. The latter were chiefly opium and its derivatives, which acted by depressing activities of the body as a whole. The physicians recognized that the patient was unable to make use of carbohydrates, and the aim was to reduce this constituent of the diet to a point at which waste no longer occurred."

From the search for a form of carbohydrate that could be taken without ill effects, the oatmeal cure of Von Noorden and the potato cure of Mosse were introduced. These methods were of great benefit, but improvement did not develop in all cases. As an example, for a long period of years the average mortality in cases of diabetes in the Massachusetts General Hospital was 28 per cent. Since 1913, however, and following the introduction of Allan's "starvation" treatment, the death rate has fallen to 4 per cent. This fasting treatment is declared to be a triumph for carefully conducted laboratory research. The physiological and pathological facts are briefly but clearly described in this article, and the writers further state that the damage is not confined to carbohydrate metabolism, but also affects proteins and fats. To permit complete oxidation of the fat to take place, it is necessary for a certain amount of carbohydrates to be present in the food. When the carbohydrates are lacking in the diet the fats are imperfectly broken up, and among the products are acids which give rise to symptoms of acidosis.

The presence of sugar in the urine, these writers state, is not to be regarded as a grave symptom. It is the continued hyperglycemia and the underlying functional difficulty in assimilating carbohydrates which are the important symptoms. The obvious remedy, therefore, is to put the mechanism of assimilation at rest. The treatment is divided into five stages:

1. *Preliminary observations*, during which the patient is not necessarily put to bed and is given a full standard diet for several days

while the total quantity of urine during each 24 hours is collected and tested for acetone, diacetic acid, and sugar.

2. *Reduction in diet.*—The patient is put to bed and the reduction in diet is begun with fats the first day, half the proteins the second day, the remaining proteins the third day, and the carbohydrates on the fourth day. The continuance of this reduction necessarily depends upon the laboratory findings.

3. *Fasting.*—In general cases no food is given on the fourth day, but the patient is encouraged to drink large quantities of lemonade or black coffee. The duration of the fast also depends upon the subject. In persistent cases, where four days' fasting has not been sufficient to clear the urine of sugar, half rations are given on the fifth day, followed by fasting. Once the urine has been rendered sugar free, no further glucosuria should be allowed to occur.

4. *Estimation of tolerance.*—This is a more difficult phase of treatment, and each case must be treated on its merits. The usual method is to add the food in inverse order to that of removal; a little carbohydrate is given for the first few days, some form of protein is given from the third to the eighth day, and lastly, fat. At this stage the most valuable food is green vegetables, such as cabbage, Brussels sprouts, spinach, leeks, cauliflower, and tomatoes. To avoid glucosuria the blood sugar must be kept low, and for this reason the carbohydrates prescribed should be equally distributed over the various meals.

5. *Maintenance.*—The ideal maintenance is one that prevents the patient losing weight, but keeps the weight just below what is normal for height and age. A fasting day or half ration should be given each week and should always be given on the return of sugar. The writer emphasized a connection between obesity and diabetes, and suggests that advanced cases may be controlled by a more general acceptance of this connection.

The nurse has abundant opportunity in the treatment of these cases to be a successful coworker with the physician. She can carefully explain the general principles of the disease to the patient and can do much to counteract the desire to overeat and the harmful advice which is usually given by friends of the patient.

This modern treatment of diabetes, it is stated, has no need for drugs except in the advent of acidosis. The patient should live a quiet life, avoid worry and excitement.

HOSPITAL NEEDS IN NEW YORK.

At a recent meeting held under the auspices of the public health committee of the New York Academy of Medicine, Dr. Lewinski Crowin brought before the meeting the following facts based on an exhaustive and intensive survey of hospitals:

(1) He stated that 32,000 hospital beds were sufficient to meet the present demand of the community in New York, and this would allow one bed for every 200 people. The average utilization of available bed capacity does not now exceed 70 per cent. In order to adjust this matter efficiently, he declared that a central hospital bureau of information should be created. He also advised a greater number of moderately priced private and semiprivate wards.

(2) In his second point he brought forward the fact that there was need for expansion of facilities for the care of convalescent and chronic disease cases.

(3) The immediate needs of hospitals were more ample funds for maintenance. In most hospitals the provision for nursing care was most inadequate. There is also great need of reorganization of training schools to attract a larger number of pupils. He also advised an increase in the number of hospital attendants.

(4) Hospitals should be utilized to a greater extent for medical research and teaching.

(5) A change of policy should be made in order to permit a larger number of physicians to have the opportunities of hospital practice.

(6) There is a distinct need for more uniform method of statistical and financial accounting of hospitals.

In commenting on Dr. Crowin's paper, Dr. Goldwater pointed out that the private and semiprivate rooms would require a great increase in the nursing force, which was already inadequate. He cited the instance of the Boston City Hospital, which decreased the ward capacity and increased the private and semiprivate rooms. The utter inability of the nursing force to give adequate care to these patients resulted in the elimination of the semiprivate and private rooms and the return to the open-ward principle.

Dr. W. Gilman Thompson outlined the function of the proposed hospital information bureau:

1. The collection of information of all kinds regarding details of hospital construction, organization, maintenance, and administration.

2. To tabulate and report this information.

3. To publish important facts concerning the general hospital situation.

4. To collect architects' plans of existing new hospitals and general literature on the subject.

5. To furnish this information to those who were contemplating new hospital construction.

6. To aid in equalizing and balancing hospital service in many ways, such as preventing overcrowding in some institutions while others are practically empty.

The commissioner of public welfare spoke for the municipal hospitals. He emphasized the fact that a teacher should be able to do the things he was teaching. He stated if there could be co-operation between great public hospitals, the Academy of Medicine, the private institutions, and the medical schools, it would be possible to develop post graduate medical work which would make New York City the great medical center of the country. He sounded a word of warning against foundations which would tend to standardize and retard this work.

ODD NOTES.

Dr. Brown, of the Royal Maternity Hospital, states that out of 80 deaths of infants during the first week 21 deaths, or 26 per cent, were caused by pneumonia. In the infant there is very little defensive reaction, and in the first few days of life pneumonia is an insidious disease, generally presenting no characteristic symptoms. Pneumonia in infants is often due to antenatal infection from premature rupture of the membrane. Acute and rapid congestion from infected lungs may cause the fragile fetal vessels to give way, causing sudden death by blood being poured into the alveoli and bronchi. Dr. Brown advises increased care that the membranes be not ruptured and that recently born infants should be more carefully guarded against infection.

A strong plea has been made for the segregation of cases of pneumonia, especially among children. It is hoped the time will come when cases of pneumonia will no longer be treated in the general ward.

The New York Medical Journal writes of the use of vitamines and states that manufacturers more interested in profits than in results tend to exploit their wares before the public. The market has been flooded by numerous products and the appeal is made direct to the public. There are, of course, certain carefully made vitamine products for medicinal use under the direction of the physician, and in a reaction against the uncertified products care should be taken not to eliminate this remedy.

In a recent lecture delivered at the British Dentists' Hospital the lecturer stated the British had the worst teeth in the world, and that the prevalence of diseases of the teeth was for the most part due

to faulty dietetic customs and to that extent were preventable. The art of mastication has been lost, the lecturer declared, and people do not chew; they suck their food.

Segaqui emphasized the instructive character of the neck sign in meningitis, which is the involuntary flexing of the legs on the thigh and the thigh on the pelvis when the head is passively forced toward the sternum.

A persisting boil fistula was cured by packing it with gauze dipped in olive oil. The oil prevented the soaking up of the fluids from below and gave the opening a chance to heal.

The crystalline lens of the eye is the one portion of the human body which continues to increase in size throughout life. The tongue of a woman is smaller than that of a man of equal size and weight.

The Supreme Court, overruling exceptions from a physician in Massachusetts who had been requested to appear before the board of registration, stated: "Mere intellectual power and scientific achievement without uprightness of character may be more harmful than ignorance."

You can not build a reputation on the things you are going to do. What we are to-morrow is what we make ourselves to-day.

83002—22——11

DIGEST OF DECISIONS.

DISABILITY IN THE LINE OF DUTY.

AUGUST 23, 1921.

To: Bureau of Navigation.

Subject: B. J. W., chief gunner's mate, United States Navy., claim for arrears of pay in the case of.

Inclosures: (1) Complete medical history of Chief Gunner's Mate J. W. B., United States Navy, from June 3, 1919, to July 19, 1921. (2) Résumé of medical literature showing cases of transverse myelitis developing after administration of salvarsan.

1. The above-named man has, in the letter attached, put in a claim for pay from the date of his original checkage on the 3d of June, 1919, because the infection was not due to his own misconduct and the fact that he had, as he claims, a primary sore upon his lip, which sore was contracted from members of the crew of the ship on which he was serving who had syphilis. This bureau has not been able to find any health record at time of admission which substantiates this statement. However, when he was admitted to the base hospital No. 5, Brest, France, he was given seven injections of neosalvarsan within a period of 24 days, the last injection being on June 27, 1918. On July 1, 1918, he was taken sick with fever, vomiting, purging, and severe headache—symptoms of arsenical poisoning. On July 4, 1918, he became paralyzed, which paralysis has persisted up to the present time.

2. He was carried on the sick list with a diagnosis of syphilis not in the line of duty, due to his own misconduct, from June 3, 1918, to July 13, 1921, when his diagnosis was changed to myelitis, transverse, origin in the line of duty, disability not the result of his own misconduct; paralysis due to arsenical treatment.

3. The board of medical survey on July 19, 1921, found him suffering from transverse myelitis, origin in the line of duty. Disability not the result of his own misconduct and that the present condition may be due to the arsenical treatment of the patient with salvarsan. The recommendation of this board was approved by the Bureau of Medicine and Surgery on August 16, 1921.

4. In view of the above facts it is recommended that this case be referred to the Judge Advocate General for an expression of opinion as to the origin of his disability, and if it be found in the line of duty from what date the origin "in the line of duty" should be credited.

5. This bureau feels that Chief Gunner's Mate B. should be given the benefit of the doubt and given "in the line of duty" for the following reasons:

1. There is no record to show the location of the primary sore.

2. There is no fact recorded to discredit Chief Gunner's Mate B.'s statement that the infection was accidental as claimed.

3. The medical literature shows that there have been cases of paralysis following administration of salvarsan and neosalvarsan.

6. Return of all papers requested.

E. R. STITT,
Surgeon General, United States Navy.

OCTOBER 10, 1921.

[2d indorsement.]

From: The Judge Advocate General.
To: The Chief of the Bureau of Navigation.
Via: Bureau of Medicine and Surgery.
Subject: B. J. W., C. G. M., U. S. Navy re origin of physical disability.

1. Forwarded.

2. The facts presented in this case are briefly as follows:

On June 3, 1918, the above-named man was placed on the sick list with a diagnosis of syphilis, origin not in line of duty, disability due to his own misconduct. He was immediately subjected to intensive arsenical treatment, and on July 1, 1918, developed a complete paralysis of the lower extremities. On July 19, 1921, a board of medical survey at the United States Naval Hospital, New York, N. Y., after considering all the facts in the case changed the diagnosis to myelitis transverse (530), origin line of duty and not the result of his own misconduct. This board further found as follows:

"Patient gives history of accidental syphilitic infection in 1918. Although the admission was not in line of duty, no facts are recorded to discredit the patient's statement that the disease (syphilis) did follow accidental infection as claimed. The likelihood that the present condition may be due to arsenical poisoning following repeated administration of salvarsan is also taken into consideration. Partial paralysis of both legs renders patient unfit for further service."

3. So much of the statement of the board of medical survey as refers to the original disability is in accord with the recent decisions of the department (File Nos. 7657–390: 40; 29372–8). Assuming, however, for the purpose of this decision that the original disability was not in line of duty, the further proposition relative to the disability growing out of the administration of the treatment by proper medical authority is presented. This proposition was fully considered by the department in the case of an enlisted man who contracted this disease (syphilis) not in line of duty, but as a result of his own misconduct, and died from the administration of five doses of salvarsan by proper medical authority. In that case the department held that the patient's death being due to the treatment administered to him by proper medical authority, it was incurred in line of duty. In commenting upon this purposition it was stated as "immaterial that the disease for which he was being treated was contracted not in the line of duty and was acquired as a result of his own misconduct, the fact being established that death was not the result of the disease, but of the medical treatment for the disease." (J. A. G., Apr. 29, 1918, File No. 26543–213.)

4. In view of the foregoing I am of the opinion that the disability complained of in this case was incurred in the line of duty and you are so advised.

J. L. LATIMER.

Approved October 10, 1921.
EDWIN DENBY,
Secretary of the Navy.

BOOK NOTICES.

Publishers submitting books for review are requested to address hem as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the ontrary.

REVIEWERS.

Captain J. S. Taylor, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.

" It is astonishing with how little reading a doctor can practice medicine, but it is not stonishing how badly he may do it."

DISEASES OF THE SKIN, BY *Richard L. Sutton, M. D., professor of diseases of the skin, University of Kansas.* Fourth edition. C. V. Mosby Co., St. Louis, Mo., 1921.

This work has most deservedly passed into a fourth edition. Its peculiar merits are a clear and simple exposition of the subject in erms intelligible to the general practitioner; an admirable résumé f the general etiology and pathology, symptomatology, and general rinciples and methods of treatment. The first hundred pages, which eal with the above topics, are unusually well done and in themselves ustify the work. The great bulk of the illustrations are splendid and ome as near conveying a conception of the lesions discussed as it is ossible for pictures to do. (J. S. T.)

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY, BY *W. A. Newman Dorland, A. M., M. D., F. A. C. S.* Eleventh edition. W. B. Saunders Co., Philadelphia, Pa., 1921.

Two years have elapsed since the publication of the tenth edition f this well-known medical dictionary, and in the interval many new ords have been coined. Additions have been most numerous in the elds of biologic chemistry, endocrinology, immunology, and neu- logy, yet it is apparent that in the revision every branch of medical cience has received its share of new terms. (W. M. K.)

Operative Surgery, by *J. Shelton Horsley, M. D., F. A. C. S., attending surgeon, St. Elizabeths Hospital, Richmond, Va.* C. V. Mosby Co., St. Louis, Mo., 1921.

In this useful book, as the author tells us in the preface, emphasis has been laid upon the preservation of physiologic function and the interpretation of the biologic processes that follow surgical operations, factors generally neglected in most works on operative surgery. These processes are brought out in consideration of the subject of surgical drainage, which is usually considered solely as a mechanical process, in the treatment of fracture and ulcer of the stomach, in the operations for aneurism, and in plastic surgery. The author has shown wisdom in describing only those operations which he has performed successfully himself or else one that appears to him to be the operation best suited for the disease; hence the book may be considered a record of the author's personal experience. The work covers the whole field of operative surgery and is excellently illustrated with 613 original illustrations; in fact, much of the interest in the book centers on the illustrations by Miss Helen Lorraine. (W. M. K.)

The Practice of Urology, by *Charles H. Chetwood, M. D., LL. D., F. A. C. S., professor of genito-urinary surgery, New York Polyclinic; visiting surgeon to Bellevue Hospital.* Third Edition. William Wood & Co., New York, 1921.

A comparison of the text of the third edition of this well-known work on urology with that of the second edition, published in 1916, shows that few changes have been made in the revision. Here and there a sentence has been added or omitted or a statement has been slightly qualified. A few new illustrations have been incorporated in the new edition, while some which graced the second edition have been eliminated or altered slightly.

In this edition the author has eliminated mention of the intravenous injection of phylacogens of the mixed variety, which has proved too dangerous to warrant its indorsement. The subjects of urethroscopy and cystoscopy are more fully discussed. As with improved instruments the cases are few and far between in which the ureters can not be catheterized by a skillful operator, less space has been devoted to the Ley's urine separator, which at one time was considered an indispensable adjunct to the urologist's amamentarium. The section on syphilis has been largely rewritten.

Among the new features mentioned are a description of the author's cystoscope and the manner of its use; the employment of emollient and antiseptic pastes for chronic urethritis of a diffuse nature, especially in inflammation that affect the superficial mucosa rather than its follicles; an open operation for drainage and radium treatment in tumor of the bladder; and an operation for contracture of the neck of the bladder by excision of a section of the orifice.

In the preface to the third edition the author says: "The principles adhered to in the original edition have been retained, and there

has not been demanded a radical change in the material for the present issue.

"In the field of urology legitimate changes have not been many, and the author, while endeavoring to utilize every advancement is reluctant to abandon tried and established methods unless fully warranted in doing so.

"The principal progress in the urological field has come as a result of more intensive study of cases, individually and in groups, which has entailed greater precision in diagnosis and more careful preparation for operation." (W. M. K.)

QUERIES.

Medical officers are invited to submit queries and to present their problems to the BULLENTIN, *which, being in a position to draw on varied and extensive sources of information such as are not available elsewhere, will use every means of securing authoritative opinion.*

All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

TO THE EDITOR.—I would like to know the value of Jennings's test for color perception and whether it is likely to supersede Holmgren's test in the Navy.

Lieutenant, Medical Corps, U. S. N.

This query was submitted to three medical officers who have devoted considerable attention to the study of tests for color perception. The opinions rendered are incorporated in the following:

It seems to be the consensus of opinion that the Holmgren test can no longer be considered reliable and that color-blind persons often easily pass the test, and that many who are color-blind are rejected by it. However, up to the present time, no convenient substitute for this test has been suggested.

The Jennings test has several advantages over the test of Holmgren. The colors are not soiled by handling; the container is not so large and bulky and the yarns are much smaller and therefore permit of more accurately designating the central color perception. The self-recording sheet is probably not an advantage; it is often carelessly placed in the box and this produces an error in the record. The test fails to detect those color defectives who have a shortening of the red end of the spectrum.

The examiner has no opportunity to group together the darker shades of red, green, and brown in order to demonstrate whether the applicant is defective for dark reds or not, because the colored yarns are fixed on the cards and can not be removed. The yarns in the Jennings test are just as liable to fade as Holmgren's yarns.

A serious defect of the Jennings test is that any moderately color-blind individual, after a little study and practice with the test, will be able to make his selection from memory.

It is the belief of many that the Holmgren test, although consuming more time for its application and possessing some disadvantages, will give results in the Navy which are less difficult of interpretation

than those obtained by the Jennings test. It is not believed that the Jennings test will be officially adopted by the Navy.

It is possible that another test will be developed in the future which will supersede both the Holmgren and the Jennings test.

Two articles on color-blindness have recently appeared, one, "Remarks on color-blindness, together with some of the objections found, with a few of the color perception tests now in use," was published in the United States Naval Medical Bulletin for October, 1921; the other on "Men invalided with color-blindness an unnecessary expense," is to be found in "Notes on Preventive Medicine for Medical Officers," United States Navy, Bulletin No. 111.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. Jones, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

INDUSTRIAL HYGIENE AT NAVY YARDS.

Industrial hygiene may be defined as that branch of preventive medicine which has to do with the application of the principles of hygiene and sanitation with a view to the prevention of disease and injuries and the promotion and conservation of physical and mental welfare of the workers, as well as the protection of the employer. The principal factor that has brought industrial hygiene to the forefront in the minds of managers of large industrial plants is the need of protecting the health of the employees in order to check the ceaseless change in the personnel of the working staff of large industrial organizations. Changes resulting from dismissals, retirements, etc., in the hazardous industries particularly, are at times so great that in order to keep up a working force of 1,000 men it has frequently been necessary to engage from 5,000 to 10,000 employees per year.[1] The desire on the part of the employer to reduce this labor turnover is in a measure responsible for the organization of medical departments at large industrial establishments.

Inasmuch as practically all States now have laws which require the employer to compensate the employee for his injuries, the factory manager realizes that he must take more interest in industrial hygiene to protect himself from financial loss.

The Navy, which employs in the neighborhood of 59,000 civilian employees, was one of the pioneers in industrial hygiene, and it seems reasonable to assume that the Navy should have as well an organized and functioning department of industrial hygiene at its navy yards as now exists at most of the civilian industrial plants. By no means is it inferred that the medical departments at navy yards are not performing their duties at present in a proper manner, but it is felt

[1] Mock: Industrial Medicine and Surgery.

that as a result of the present organization at navy yards this work is limited and that it could be extended and be made of more service to the employee as well as to the Government.

The medical department at navy yards at present maintains a yard dispensary for the treatment of civil employees who might become sick while at work or who may be injured. It is also responsible for the sanitary conditions existing in the yard. However, there is one most important phase of the problem of industrial hygiene which is being neglected at most navy yards, not through any fault of the medical officers on duty there, but rather to the existing organization; that is, preventive medicine. It is not only necessary to correct sanitary defects but it is equally as important to preclude the occurrence of preventable diseases incident to occupation, as well as injuries. Mock states, "A comprehensive system of the supervision of the health of employees must include every branch of preventive medicine and surgery, and of remedial medicine and surgery, as well as industrial hygiene and sanitation. These are primarily medical functions and must be administered by the medical department of an industry. . . ."

The tendency to give more and more power to the medical director of civilian industries is growing, and certainly demonstrates that all things which increase the health of the employees must increase the dividends of the employer. It also demonstrates that his position in industry must constantly expand and he must become fully cognizant of those activities which can well be called the adjuncts to health supervision. Since the Navy does not control the compensation of its injured or sick employees and since this is controlled by the compensation board, a separate and distinct Government organization, it is believed that this dual responsibility for the welfare of the employees has been the cause of the neglect on the part of the Navy in instituting all preventive measures which have been carried on to a much greater extent in civil establishments. Within recent years a number of navy yards have employed a safety engineer, whose principal duty was to devise means for the prevention of accidents, but inasmuch as he was not a medical man he often did not see the broader aspects of the situation. Consequently the results from his endeavors were not of as much magnitude as they might have been. At a good many yards the safety engineer has been dismissed, and at present there is no one to care for this phase of industrial hygiene. It is considered that a medical officer could be detailed by the commandant to act in the capacity of industrial hygienist of the yard. His duties would be to recommend, through the senior medical officer, laws and regulations governing the operation of machinery

in so far as they relate to the health of the men, as well as necessary sanitary laws and regulations for the protection of their health. Furthermore, he should be required to inspect the working places, to insure the maintenance of sanitary methods and conditions and to discover any insanitary conditions. He should investigate all cases of occupational diseases and should make every endeavor to determine how such accidents or diseases might have been caused. In this way he will be in a position to recommend proper safety devices and regulations for the prevention of accident and disease. Moreover, he should investigate conditions to discover whether the poor health of the men has been the contributory cause toward accidents and inefficiency among the employees.

The recent World War demonstrated clearly that it was of paramount importance to guard the lives and health of the industrial army, which could not be readily replaced. Paradoxical as this may seem, it is nevertheless true that the war brought about a more widespread recognition on the part of industrial managers for the need of conserving human life. During the war it was shown that it was a sound business proposition to safeguard the health and efficiency of the worker by sensible observance of the facts and teachings of psychological science. The large industrial concerns, as a result of their experience with the application of the principles of industrial hygiene during this period, have not only continued their departments of medicine but have enlarged their scope, notwithstanding the fact that the country has been in the midst of an industrial panic. Since preventive medicine has been introduced into industries results have been beneficial not only to the health and welfare of the worker but also to the quality and quantity of output and to the economics of industrial management. Collis and Greenwood, in "The Health of the Industrial Worker," state that "in order to attain ends so important to the industrial world in particular, and the community in general, definite persons must be appointed to carry out definite duties."

The activities of a well-organized department of health of any industrial concern should consist of:

(*a*) Medical service.
(*b*) Surgical service.
(*c*) Preventive medicine service.
    1. Safety service.
    2. Sanitation service.
    3. Educational service.
(*d*) Dental service.
(*e*) Nursing service.

The following may be considered as adjuncts to the medical department of an industry:

(*a*) Employees' service.
(*b*) Restaurant service.
(*c*) Recreation service.
(*d*) Welfare service.
(*e*) Insurance service.
(*f*) Banking and loan service.
(*g*) Housing and community service.

At navy yards there is already a medical and surgical service for civil employees, and a sanitation service; but there is no well-organized preventive medicine, dental, or nursing services. Whereas the dental and nursing services may be desirable, they are not deemed practical at the present time; but it is felt that a distinctly industrial preventive-medicine service is urgently needed. Such services as the employees' service, restaurant service, recreation service, welfare service, insurance service, banking and loan service, and housing and community service are under the management of other departments, and, in such an organization as a navy yard, it is believed that these services might well remain where they are. It is obvious that the medical officer in the navy yard should keep in close touch with all services which have been considered as adjuncts to the medical service.

MEDICAL AND SURGICAL SERVICE.

The medical and surgical service in navy yards is in all respects properly handled. However, it is greatly handicapped at present by the fact that the medical service does not examine physically all persons who are employed in the navy yard. It has been reported that many men who are employed upon presentation of a certificate from a civilian physician could not pass the physical examination as given at the yard dispensary, and the resulting lowering of the physical standard consequently decreases the efficiency of the yard. It is believed that every employee should be examined by a naval medical officer who is responsible to the Government.

DENTAL SERVICE.

When it is considered that in many instances such chronic diseases as rheumatism may be traceable to poor teeth and that comparatively few adults in the industrial world ever brush their teeth or have ever visited a dentist, is it wrong to assume that the industrial manager can save himself money by giving this attention to employees?

As a matter of fact, civilian industry is now doing for the adult what school dental hygiene is doing for the child. Can not the Navy also give this service to its men, and thereby further promote their interest in personal hygiene?

NURSING SERVICE.

A nursing service would be of distinct advantage to each navy yard dispensary, but at the present time it is not deemed feasible to detail nurses for special duty at navy yards. It is hoped, though, that in time medical departments at navy yards may include this valuable adjunct to its organization.

PREVENTIVE-MEDICINE SERVICE.

Safety service.—No system of supervision of the health of employees is complete unless suitable provision is made for the prevention of accidents and disease. Therefore it is essential that the mechanical condition of working places should be regularly surveyed by a competent medical officer. After a complete survey has been made the medical officer should make daily inspections of the buildings to see that the various safeguards for the prevention of accidents are used and that the men are taking advantage of the education which has been disseminated. A medical officer acting as industrial hygienist must also investigate every accident in order to devise means for the prevention of recurrence. Each individual who is injured should be examined thoroughly with a view to discovering how the accident occurred and by what means such accidents may be prevented in the future. It may be found that the injury may have been the result of fatigue or the mental condition of the man at the time of the accident.

Sanitation service.—The sanitary conditions existing in the navy yards have a very definite bearing on the comfort and health of the employees. It is a fact well known to industrial engineers that industrial sanitation has a marked effect upon the production of the employees. Insanitary conditions not only cause sickness but discontent among the employees, resulting in a great labor turnover and in retardation of production. From the viewpoint of preventive medicine sanitary inspections are of nearly as much importance as the physical examination of the men before and during employment and the preventive measures used against accidents. It has been shown by many industrial hygienists that the ventilation, the lighting, the temperature, humidity, and many other factors have a most important effect, not only upon the causation of accidents but upon the efficiency of the workmen. Such factors as the removal of gases,

dust, etc., from the working places is a most important duty of the industrial hygienist.

Educational service.—Another most important duty of the industrial hygienist is the education of the employee, who should be taught the necessity and advantages of proper living. By means of lectures, bulletins, moving pictures, etc., such concerns as the Ford Motor Co. and many others have been able to educate the personnel as to the dangers and consequences of industrial diseases, accidents, etc., as well as to give them a clearer idea of the benefits to be derived from the proper observance of the laws of nature.

Recognizing the fact that accident prevention depends largely upon inspection and education, the National Association of Manufacturers has been very active in stimulating employers to adopt these two means of protecting the lives and limbs of their employees. Mock states that the fact that compensation underwriters make a 15 per cent reduction in premiums in those industries where the standard safety, organization, inspection, and educational chart of the National Manufacturers' Association have been used indicates in a way the value of this form of prevention. It is impossible, however, to set forth in dollars and cents the great saving to employers or the increased earning capacity from enlarged production which this or any other form of accident prevention brings about.

The problem of industrial hygiene in the Navy is somewhat different from that in civil life. Nevertheless, it is believed that the Navy should and can improve its methods of dealing with this problem. If the medical department of each navy yard would consider its individual problems and endeavor to inaugurate a division of preventive industrial hygiene, it is believed that within a comparatively short time the work performed by that navy yard would soon demonstrate its value. To devise an organization for the navy yards as a group might be wise, but it is felt that the medical officers at the navy yards are in a better position to formulate plans than any officer in the Bureau of Medicine and Surgery. It is therefore urgently recommended that all medical officers give this their most serious attention.

The Bureau recommends that each navy yard obtain the following books dealing with industrial hygiene:

Industrial Medicine and Surgery; Mock. W. B. Saunders, New York City.

The Health of the Industrial Worker; Collis and Greenwood. J. & A. Churchill, London, England.

It would also be advisable for each navy yard to subscribe to the following magazines:

National Safety News, 168 North Michigan Avenue, Chicago, Ill.

Journal of Industrial Hygiene, 66 Seavern Avenue, Boston, Mass.

The Nation's Health, published by the Modern Hospital Publishing Co., Chicago, Ill.

However, at present, requisitions for such journals can not be approved on account of shortage of funds.

THE NEED OF INDUSTRIAL PHYSICIANS AT NAVY YARDS.

By Lieutenant Commander A. H. Allen, Medical Corps, United States Navy.

Since the passage of the Federal compensation act of 1918, medical officers attached to navy yards have been confronted with many new problems which have brought forcibly to their attention the fact that the Federal Government is responsible for its civilian employees if they are incapacitated as a result of their employment in the various activities of the United States Navy. Such large corporations as the United States Steel Co., Cramp's Shipyards, and the General Motors Co. are subject to State compensation laws which are similar to the Federal compensation act of 1918. The experiences of civilian industrial physicians are in many ways comparable with those of naval medical officers.

When compensation laws were first made effective the large civilian industrial corporations immediately employed a safety engineer who was directed to make frequent surveys of their shops with a view of adopting and maintaining safety devices which would prevent accidents and thereby lessen the number of claims for compensation. The safety engineer was paid an average annual salary of about $3,500. At the same time a physician was also employed to be on duty for several hours a day in the plant dispensary and to be available by telephone at other hours in case of severe accident. His duties were limited to the work in the dispensary and consisted of dressing and redressing minor ambulatory cases. Contracts were made with various hospitals to receive and treat all serious cases. The so-called "part-time" doctor received an average salary of about $2,500 a year.

This scheme was not entirely satisfactory, inasmuch as the doctor was oftentimes not available when most needed, and again because of the fact that he did not have sufficient familiarity with shop conditions to give advice on questions relative to the sanitation of the shops as well as the best methods to be adopted for the prevention of accidents and other industrial hazards. He had neither the time nor the inclination to devote his energies to this phase of the work. Furthermore, it was the experience of industrial concerns that it was impossible to obtain the services of the best physicians and that the

men so employed were usualy mediocre in their professional attainments as well as in their general ability as men.

Recently the larger corporations have found it to be to their financial advantage to adopt a plan somewhat as follows: A well-qualified, active, and intelligent physician is employed at a salary of between $5,000 and $15,000 a year to devote his entire time to industrial medicine. He replaced the safety engineer and the "part-time" doctor. Such a physician is not only responsible for the treatment of the sick and injured at the plant dispensary, but is also required to spend a part of each day in at least one shop, familiarizing himself with the sanitary features, with the character of the work being done, and the tools and machinery used. Experience has demonstrated that an intelligent man with medical training can in a short time become sufficiently familiar with the tools and machines of a large industrial plant so that his recommendations for the application of safety methods for handling particular tools and machines are practicable. The education of the employee and employer in all matters relating to preventive medicine is also a most important duty of an industrial physician. Consequently, he has to keep himself informed by reading and studying the recent literature dealing with industrial hygiene, which are issued by the Federal and State Governments and such organizations as the safety council.

It is essential for the industrial physician to know personally the foremen of the various shops and to be on friendly terms with them in order to inspire their confidence, not only as a doctor, but as a man who understands machinery and whose ideas relative to its safe operation are valuable. He must give frequent lectures to the men working in shops and must receive the cooperation of these foremen in his campaign against the prevention of accidents and industrial diseases.

In case of an accident the industrial physician first administers "first-aid," then proceeds to the scene of the accident and determines its cause. If the accident is found to be preventable, steps are then taken to prevent its recurrence.

Most corporations are far in advance of the Navy in their general method of giving medical treatment to their employees. In private concerns a workman is able to secure free medical treatment for minor infections, such as colds, headaches, indigestion, etc. He is also granted the privilege of receiving dental treatment when required.

When it is considered that these private concerns find it to their financial advantage to do so much more for their employees than the Navy Department, the question immediately arises as to whether it would not be advisable to employ a medical officer at various navy

yards in a similar capacity. It might be said that all of these duties are included in the duties of a senior medical officer, and theoretically this is so. Actually, however, the time of a senior medical officer is too much occupied with other naval duties to permit him to carry out properly the duties of an industrial hygienist. In order to carry out such duties properly a medical officer must give his whole time to this in exactly the same manner as a civilian industrial physician gives to his work. Industrial medicine is becoming a distinct specialty in the medical science, as much so as surgery, otology, etc.

In the interests of economy alone it is believed that the employment of a medical officer at each navy yard as an industrial hygienist would show as much saving to the Government as has been experienced by the various private concerns. The medical officer assigned to this duty should be ordered to the yard by the Bureau of Navigation for this particular work and should not be assigned to other duties. He should be junior to the senior medical officer of the yard, who would then be in a position to know the results which are being obtained—first, in the reduction of the accidents and other industrial diseases; second, in the diminution of the number of compensation cases; and third, in the reduction of time lost in dealing with less severe accidents, abrasions, foreign bodies in the eye, etc. Each medical officer who is ordered to this particular duty should be given orders which would permit him to visit several large industrial concerns in order that he might familiarize himself with what is being done at such plants. He should also be permitted to become a member of the American Association of Industrial Physicians and Surgeons and be given orders which would permit him to attend their meetings.

PROMINENT INDUSTRIAL HYGIENISTS' VIEWS UPON THE RELATIONSHIP OF THE EMPLOYER, EMPLOYEE, AND THE INDUSTRIAL HYGIENIST.

Dr. Otto F. Geier, of the Cincinnati Milling Machine Co., discusses very forcibly the many problems of industrial hygiene in the Nation's Health of December, 1921, in an article entitled "Life saving makes a popular appeal." Whereas, apparently, Dr. Geier's principal intention was to give a résumé of the effect of the industrial physicians' exhibit at the Cincinnati Health Exposition upon society at large, he has discussed very forcibly the many phases of industrial hygiene which are of utmost importance to the naval medical officer.

It is shown very clearly that the industrial physicians' exhibit of the Cincinnati Health Exposition had a most marked effect upon the managers of industry, the employees in industry, and the general population.

The following extracts are quoted from Dr. Geier's most excellent article:

"The far-seeing industrial leader knows that we can not secure the needed energy, cooperation, the willingness to produce, out of men whose bodies are cramped by sickness and whose minds are twisted and poisoned through a rankling sense of injustice or through unnecessary suffering by injury and ill health. The intelligent employing groups know that the new competition will not permit the wastage of millions weekly on account of preventable illness and accidents. . . ."

"That management here and there is taking serious account of its stewardship was indicated at a meeting held recently in Boston, where the representatives of the Associated Industries of Massachusetts, the Boston Employment Managers' Association, met in conference with those of the American Association of Industrial Physicians. How these business men evaluated industrial medicine may best be shown by brief quotations. Mr. Andrews, the president of the Associated Industries, said: 'The employer, not as a matter of charity but as a matter of sound business methods and as a matter of discharging an obligation toward those who are associated with him, finds that there is something to be done by management in relation to health of his workers.' Mr. John Spence, works manager Norton Grinding Co., in concluding his appreciation of the value of medical supervision, said: 'I am quite convinced, however, that even from the standpoint of a money valuation that there is just as much profit, if not more, in this kind of work as in the careful maintenance of the plant.' Mr. S. A. Robertson, manager Eastman Kodak Co., speaking to the same point and referring to their 120 per cent wage increase since 1914 with only 27 per cent increase in labor costs, said: 'What part of this increase in output the medical department is responsible for no one can tell, but we are convinced that a good ratio of that increased production is probably due to the care of the physical condition of the workman, . . . and unless he (the employer) is big enough to put these things over and get the cooperation of his employees he will be a failure in the manufacturing business.' Mr. Howell Cheney, of Cheney Bros., South Manchester, Conn., speaking on the subject of medical service as affecting industrial relations, said: 'To some degree the stability of these United States depends upon the effectiveness of your contribution of medicine to the industrial organization. It is impossible to doubt that the industrial physician has made a great contribution to this job of bringing about better relations between the employer and the employed; that should he go industry will have lost what it never can replace in other ways. Having achieved that vision, the battle is half won. . . .'

"The thoughtless employer blames the labor agitator for most of the radicalism that appears in the ranks of labor, giving little thought to the fact that he may himself contribute largely to the prevalence of that state of mind. The employer is often prone to forget the enormous advantage that he holds over the labor leader, in that he through his organization is in daily contact with the worker whereas the radical labor leader's contacts are but intermittent. Too few employers appreciate that the unclean, unsafe shop, where the foremen and executives drive rather than lead their men—where even the common garden variety of human considerations, comforts, and conveniences are missing—is also the shop where the men's minds are daily poisoned against organized industrial leadership and, conversely, opened to any other leadership that may offer. It is during the working hours of the day that men's minds are most alert and receptive, and it is important, therefore, that the impressions that are hourly being made upon those minds should be free from fair criticism. Unnecessary and frequent accidents, preventable occupational hazards, thoughtless treatment of employees, wasteful methods of production, slipshod wage system, where the employee is unable to check his own earnings, are all factors that lead to disagreeable relations between the employer and employee and add to the age-long gulf between labor and capital. . . .

"It can not be denied that clean working conditions, reasonable comforts and conveniences, a fair wage system, and considerate personal relations throughout the working hours produces a state of mind, a shop spirit, a certain morale, that makes for a feeling of responsibility throughout the organization, an appreciation of the necessity for organization and the part that each must play in such Out of this feeling of mutual trust and confidence there grows a respect, not only for the industry but for society as it is organized and a better quality of citizenship is the net result. The consideration of the health of the worker is but one factor in the important personal relations program, but it goes a long way to help make men sane both in body and mind. Contented citizenship does not grow out of a populace which is suffering from unnecessary illness and injury. Many of the so-called grievances can be traced to a physical basis. Not the least satisfaction that should come to the intelligent employer in creating a good shop morale through these various methods should be that he also creates thereby happier, contented conditions in the homes of his employees. And thus is affected an even wider circle of citizenship. . . .

"The dollars and cents value of the prevention of unnecessary accidents has been thoroughly proved by the National Safety Council that little need be added in that direction. What the employer has

ailed to sense, however, is that enormous savings can be made by he prompt and efficient treatment of all accidents as they occur and hat the installation of medical departments in industry has long go been taken out of the charity welfare class. The immediate at-ention to injuries by men especially trained in that work not only educes the number of infected cases to practically nothing but reatly shortens the period of disability, reduces unnecessary pain, educes the loss of wages, and, of course, adds to production. . . .

"The value of the prevention of illness and the value of life—pro-ongation methods are so well accepted to-day that we can well judge he intelligence of Governments—national, State, and local—by the ype of work that is carried on by them to assure their citizens reedom from contagious diseases. Millions are expended in pro-ecting the food and water supplies and giving proper medical super-ision to the growing child at school. A great many more millions, owever, are spent in the erection and maintenance of hospitals argely used for curative work. Relatively little is spent by com-nunities in an intensive application to the individual of the science f the prevention of disease or its early diagnosis.

"The difficulty ever has been for society so to organize its super-isory forces as to make medical attention so accessible and con-enient that individuals at large would apply for such medical at-ention at the incipient stage of illnesses. It has been practically mpossible to educate the average man to consult a physician reg-ularly for a physical examination that would discover any deficien-ies that may exist and to correct them promptly, so that they will ot become permanent in their nature and thus interfere with his arning capacity.

"With the establishment of the new specialty, industrial medicine, nd the placing of the physician in industry, medical attention has for he first time become daily and conveniently accessible to the adult. ntensive preventive medicine applied to the individual here becomes ossible. It is sought out by 7 per cent of the working force each lay in some industries. To supply such service costs from $5 to 12 per employee per year. The fact that the best management in he country have continued this service indicates that it must pay or itself.

"Modern management spends vast sums in keeping its machinery nd equipment in a high degree of perfection. The human body of he worker is the most delicate and valuable machine in the plant. Upon its efficiency, physical and mental, finally depends the effi-iency and output of the machinery and other equipment. Poor ealth is a great drag on the employee and management. It spells he idle machine, lost wage, and production, and society is vitally nterested in all three.

"Good health, good shop spirit, good relations, and good management go hand in hand. . . .

"In strong contrast to the useless welfare work (that is, such devices as were used by industry to attract the worker during the war period, many of which were socially and economically unsound) is the real service that is rendered the worker and society in providing good working conditions, stability of health, the reduction of suffering, and loss from disease and accident that usually attends intelligent medical supervision. The far-seeing employer has not scrapped the services of the medical department in these parlous times, but recognizes that the physician can make a real contribution to a better morale and the necessary higher output per man at lower cost, that is so greatly needed at this time. Work here and live longer is a sane, democratic appeal to the best type of employee.

"It is always exceedingly difficult, even hazardous, to try to translate the value of preventive medicine into dollars and cents. A large insurance company recently broke its silence and made the first definite statement as to the money and lives it claims to have saved because of its periodic physical examinations. In this study 5,987 individuals, who were carefully examined annually over a period of six years, were placed alongside a comparable group of a like number of policyholders who did not elect to accept this annual physical review in those six years. The company spent $48,900 in periodic physical-examination work and effected a gross saving in death losses of $126,477 and a net saving over expenses of $77,577. The group examined show a mortality experience of 53 per cent as against the American experience table and a 72 per cent record on the American men table. It is shown that the mortality has been reduced at a cost of $1.36 per policyholder per year and that the net profit to the company on that expenditure is $2.16 per year, or a gain of 159 per cent on its money invested in this work. Even in boom times, 159 per cent is a handsome profit in industry. These figures merely suggest that, if people are worth saving, society at large is overlooking some very handsome dividends.

"Absence in industry on account of illness varies from 3 per cent to 8 per cent. Industrial medicine can reduce the absence on account of illness to 1½ per cent, perhaps even lower. Accepting the lower figure of 3 per cent as the normal and 1½ per cent absence as the attainable through medical supervision, we should save for each worker four and a half days of earning power each year. . . .

"In compiling statistics (relative to the economic advantages of industrial hygiene) one can not escape the indisputable fact that industrial medicine is preventive medicine practiced on the firing line; that the daily supervision, the accessibility of the service to the

patient, the frequency of observation, the early diagnosis and prompt treatment is the sanest and most economical way of preventing human wastage; that it keeps the front line of industrial attack and maximum production intact; that this is the best means yet devised for keeping the old-time 'evacuation stations' free from overflow of chronically incapacitated dependents; that to reduce the size of the human scrap heap most systematically we must move more of our scientifically trained medical men up to and on the industrial firing line . . . ."

Dr. Geier also discusses the advantages to be gained as a result of furnishing dental treatment and nursing service to the employee.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

HEALTH CONDITIONS IN THE NAVY.

The admission rate, entire Navy, for all causes for the month ending February 4 averaged 672 per 1,000 per annum. During the last two weeks of the month, however, the rate for the entire Navy rose from 490 to 660 and then to 723 per 1,000 per annuam, while shore rates increased from 639 to 900 and then to 1,640 per 1,000 per annum.

This rise is largely accounted for by the increase in admissions from influenza, which, for the entire Navy, averaged 84 per 1,000 per annum for the month, and by the end of the month had risen to 182 for the week ending February 4. Venereal diseases did not enter into this increase, as the average for the month was 121 per 1,000 per annum, which is not above normal.

In view of the increase in influenza, the pneumonia admission rate is of considerable interest. It has been very favorable, the average for the month being only 3.25 per 1,000 per annum, as compared with 29.67, 6.99, and 7 per 1,000 per annum for corresponding months in 1919, 1920, and 1921, respectively. Furthermore, the rate at the end of the month was decreasing rather than increasing.

Ships and shore stations reporting the largest numbers of cases of influenza were as follows:

Ship or station.	Dates of report.	Cases.
U. S. Naval Academy, Annapolis, Md	Jan. 17–Feb. 7, inclusive	162
U. S. S. Black Hawk	Jan. 14–Jan. 30, inclusive	31
U. S. S. Columbia	Jan. 10–Jan. 29, inclusive	76
U. S. S. Delaware	Jan. 18–Jan. 27, inclusive	151
U. S. S. Dixie	Jan. 20–Feb. 1, inclusive	74
U. S. Naval Training Station, Hampton Roads, Va	Jan. 18–Feb. 8, inclusive	73
U. S. Submarine Base, Hampton Roads, Va	Jan. 26–Feb. 8, inclusive	52
U. S. S. Orion	Jan. 27–Feb. 6, inclusive	36
U. S. Receiving Ship, Philadelphia, Pa	Jan. 27–Feb. 7, inclusive	47
U. S. S. Texas	Jan. 21–Feb. 3, inclusive	107
U. S. S. Wyoming	Jan. 6–Jan. 27, inclusive	115

Aside from influenza and pneumonia none of the communicable diseases exceeded an admission rate of 1 per 1,000 per annum except malaria, which averaged 20 per 1,000 per annum. There were 4 cases of cerebrospinal fever reported during the week ending February 4, 3 from the Naval Training Station, San Francisco, Calif., and 1 from the U. S. S. *Prometheus.*

Communicable diseases other than influenza continue to be a negligible factor at training stations.

By reference to Table 1 in the vital statistics section of this issue it will be seen that there have been few admissions during the past month for communicable diseases, except influenza in the fleet and malaria among those serving in the Tropics.

The following table shows the admission rates per 1,000 for certain communicable diseases which occurred during the month of January as compared with a mean annual admission rate for the same period for the previous four years:

Disease.	Average annual admission rate per 1,000, 1918–1921.	Annual admission rate per 1,000, 1922.
Cerebrospinal fever	9.90	0.00
Diphtheria	8.10	.50
Influenza	433.90	40.11
Malaria	23.90	25.03
Measles	60.60	.30
Mumps	188.30	.90
Poliomyelitis	.04	.00
Pneumonia	52.90	3.40
Scarlet fever	11.70	.40
Smallpox	.60	.30
Typhoid fever	.70	.20
Tuberculosis	13.90	4.01
Yellow fever	.24	.00

It will be noted that malaria continues to be in excess of previous years, whereas all the other communicable diseases are lower.

SOCIAL HYGIENE SECTION OF THE BUREAU OF NAVIGATION TRANSFERRED TO THE BUREAU OF MEDICINE AND SURGERY.

The social hygiene section of the Morale Division of the Bureau of Navigation was transferred to the Division of Preventive Medicine of the Bureau of Medicine and Surgery on January 27, 1922. This change was brought about on account of the general opinion in the department that such activities come more properly under the province of the Bureau of Medicine and Surgery than the Bureau of

Navigation. Moreover, a review of the statistics for the past two years did not show a sufficient reduction in the incidence of venereal infections to justify a continuation of the expenditures that had been made on publications aimed at preventing these diseases alone. Therefore, it is planned to combine the propaganda relative to social hygiene with similar instructions in general and personal hygiene as well as accident prevention. A more favorable reaction among the men and a wider range of results is anticipated.

It is believed that efforts aimed at preventing the venereal diseases are more effective when the instruction, advice, and warning are given indirectly or in conjunction with the hygiene of other diseases rather than when this subject occupies too conspicuous a place in a lecture or pamphlet. The pathological pictures and literature that have been included in most social hygiene publications have produced unfavorable comment from many sources, and it is considered now that they are of questionable value in restaining men from exposing themselves to such infections. Although individual medical officers have reported marked reduction in exposures and infections after special activity along these lines, others have failed to note any improvement, and the compiled figures for the entire service show no appreciable benefit.

Arrangements have been made to purchase several copies of a film being developed by the United States Public Health Service, which will be along the lines of biological teaching as given in schools and textbooks and will give the social-hygiene instruction in its biological and sociological aspects, together with much information concerning other communicable diseases. It is believed that this method of presenting the subject is preferable to that employed in the films previously distributed. Additional pamphlets dealing with social hygiene will not be published, although those remaining on hand will be distributed. To replace the pamphlets, the Bureau of Medicine and Surgery confidential circular of information No. 1 will be rewritten. Placards on general and personal hygiene and accident prevention will be distributed from time to time. A series of glass lantern slides for lecture purposes will also be developed along similar lines.

SMALLPOX IN THE UNITED STATES.

Attention of all medical officers in the service is invited to the fact that a virulent type of smallpox is now prevalent in several large cities of the United States.

The following, based on United States Public Health Reports, gives an idea of the severity of this strain of smallpox, which probably first appeared in the United States at Kansas City, Mo.

Time.	Kansas City, Mo.			Denver, Colo.			Chicago, Ill.		
	Cases.	Deaths.	Fatality rate.	Cases.	Deaths.	Fatality rate.	Cases.	Deaths.	Fatality rate.
Sept. 10, 1921 to Jan. 28, 1922.....	415	173	41.7%	174	55	31.6%	83	10	12%

NOTES FROM DESTROYER SQUADRONS, UNITED STATES PACIFIC FLEET.

The board of health of the State of California calls attention to the increase of smallpox in the State and the existence of typhus fever in Los Angeles. Smallpox is particularly prevalent in Bakersfield and San Jose, also in Santa Clara and Stanislaus Counties. The three cases of typhus fever in Los Angeles are definitely known to have arisen from separate sources, although those have not been proven. The disease is known to be endemic in Mexico, and the danger may be much greater than is realized, especially to the southern part of California. Medical officers will refresh their memories as to the details of this disease and instruct Hospital Corpsmen so that they may recognize or suspect the condition. All will be on the watch for possible cases and will be particularly active in campaigns against dirt and vermin, especially bedbugs and lice.

INFLUENZA ON THE U. S. S. "WYOMING."

A typical epidemic of influenza began January 6, three days out from New York, reached its peak on the fourth day with 25 new cases, and then subsided as such outbreaks usually do. No new cases occurred on the ninth day, and only a few cases, in groups of two or three, appeared thereafter. In all, 115 cases occurred during the month, making the attack rate 8.4 per cent. There were no fatalities.

During the month of December, 1921, while the ship was at the navy yard, New York, one case of influenza occurred December 13, and one on December 15. No more cases appeared until the beginning of the outbreak on January 6.

The cases varied a good deal in severity, but many of the patients were much prostrated and had high temperatures. From the clinical standpoint, it may be said that the outbreak was not materially different from many of the outbreaks as reported from ships and naval stations during the pandemic in 1918, except for the absence of fatal secondary infection with highly virulent microorganisms such as the haemolytic streptococcus.

Complications occurred in separate cases as follows: Lobar pneumonia, 4 cases; broncho-pneumonia, 5; acute pleurisy without pneumonia, 5; acute arthritis, 4; and acute otitis media, 3.

Preventive and control measures consisted in early detection of new cases; prompt segregation of the sick with confinement to bed; bedside disinfection; as much separation as possible between uncomplicated cases and those having pneumonia or profuse cough; sterilization of the crew's mess gear (a routine measure); airing of bedding when the weather permitted; and keeping the men separated and in the open air as much as possible.

The epidemic strain of the influenza virus appears to have been introduced on board in New York shortly before the ship left on January 3, 1922. The *Arkansas* and *Columbia*, also New York ships, and the *Delaware*, a Boston ship, had similar outbreaks.

INFLUENZA ON THE U. S. S. "COLUMBIA."

The U. S. S. *Columbia* had an epidemic of influenza during the month of January, which has apparently subsided, there having been no new cases since January 29.

This vessel sailed from New York on January 7, and the first case reported at the sick bay three days later, while the vessel was at Charleston, S. C. It is believed the infection was brought aboard at New York before sailing. There has been a total of 76 cases, the first case being admitted on January 10 and rapidly increasing to 12 cases admitted on the 16th, and 12 on the 17th, which was the high point. The admissions have declined slowly since the 18th. The disease was of mild type and not as severe in character as during the epidemic of 1918. There were no deaths and only one case having pneumonia symptoms.

LECTURES ON DRUG ADDICTION AS GIVEN IN THE DESTROYER SQUADRONS, UNITED STATES PACIFIC FLEET

The following is quoted from Medical Bulletin No. 1–22, destroyer squadrons, United States Pacific Fleet, showing how the destroyer squadrons of the Pacific Fleet are endeavoring to control drug addiction among its men:

In response to direction from the Bureau of Medicine and Surgery to include the subject of drug addition in instruction to men, a board of medical officers was appointed to prepare instructions on this subject to be used throughout the squadrons. Their report is given below and will be used by all medical officers and hospital corpsmen:

LECTURE ON DRUG ADDICTION

Dope, coke, snow, and hop are a few of the terms used by the average person in speaking of cocaine, morphine, heroin, and other habit-forming drugs. People who use these drugs are known as drug or dope fiends and are as a class the lowest and most miserable people in the world.

Dope is used in several ways, snuffing the powder up the nose, rubbing it on the gums, smoking the pipe, by hypodermic injection, and in pill form. Snuffing cocaine is more common because of its simplicity, and is usually the method offered to the innocent beginners.

No one begins using these drugs with the intention of becoming drug fiends. With few exceptions drug addicts take their first "shot" to see what it feels like, or "to get a kick" they suppose it gives, or "because a girl coaxes them to try it." They continue taking dope, not for its kick but to relieve terrible, gnawing aches and pains accompanied with intolerable nervousness. Nothing relieves this condition but dope—dope in ever-increasing amounts—dope that is more vital to its victim than even life. Everything is lost sight of by the drug addict in his effort to obtain enough of the drug to momentarily relieve its

crushing powers. The degenerating powers of the drug make outcasts and criminals of those who are tempted into using it. Its action is slow and treacherous, and the innocent victim finds that he is under its control too late to save himself. There follows a life of suffering and misery. The victim's life is ruined. Hopes and ambitions are put aside. Friends, family, wives, and sweethearts are forgotten. His one object in life is dope. Dope to still the body's cravings—to allow a few minutes' rest. He is a slave to dope, a hideous monster that holds him absolutely in its power. All pleasures of life are abandoned. There is no escape. One moment's freedom from dope sends the pain-racked sufferer, whining and simpering back to his master—dope. There is no life with dope, and the drug addict can not live without it. Shunned by his friends and associates, in constant distress from the drug's incessant demands, the victim, shattered in health and spirit, often seeks relief from his burden in suicide.

Federal and State laws have so restricted these drugs to proper medicinal uses that it is almost impossible to obtain them for illegimate purposes. The dope fiend must have his drug, and since he can not procure it legitimately he resorts to dealing with dope peddlers. The peddlers' prices are high, and the victim pays more and more for his drugs, as there is a constant demand from the body for ever-increasing amounts of the drug to relieve it of its cravings. To obtain money to buy these costly drugs, the victim resorts to any means. Robbery and petty thievery are common, but the victim will not allow even murder to prevent his obtaining funds to buy his drug.

Dope peddlers, hoping to increase their revenue, are always attempting to recruit new victims by passing out samples to unsuspecting people. Be careful of the crafty peddler, whether it be man or woman. The artfully colored stories they hold out to the possible recruit are but baited hooks—snares to draw you into that pitiful group that must buy from the peddler the dope to relieve their sufferings.

Be ever alert and mindful of the consequences of trifling with habit-forming drugs. Shun them as you would the deadliest poisons. Avoid the tempting bait of the artful peddler; remember always that their reasons are only for their gain and that they would not hesitate to cause you untold suffering for the few dollars your trade will give them. Dope fiends, too, will try to persuade you to try their favorite drug. They have sunken so low from normal instincts that their desire for company overbalances whatever normal impulse may have once been in their hearts. Misery loves company. Remember always what must follow. It is easy to avoid the first "shot." Don't weaken.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "CLEVELAND," FOR THE YEAR 1921.

The health of the crew has been excellent during the past year. In the Tropics a few sporadic cases of malaria occurred. These were usually recurrences, and readily amenable to treatment. The climatic bubo is a source of annoyance, but we have fortunately escaped with a small number of cases. No serious accident has occurred during the year.

The venereal problem remains as serious as ever, particularly in Central American cities. It was found necessary to restrict the liberty of the crew to two days a week at one port, liberty expiring at sunset. A patrol was placed on streets where known houses of prostitution existed, and lectures were given at frequent intervals to the men regarding the dangers confronting them.

These measures proved to be effective. Prepared talks were given to the crew from time to time regarding the cause, prevention, and dangers of venereal disease. The moral side of the question was emphasized in the talks, and an appeal was made to the men's sense of duty and obligation to the ship. Posters and pamphlets were also used in disseminating information.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "CULGOA," FOR THE YEAR 1921.

The health of the crew during the period covered by this report has been excellent, in spite of the fact that there has been some overcrowding in the crew's living spaces. Fifty-six cases have been sent to the hospital. Five of these were passengers who were brought north from Haiti and Santo Domingo.

The percentage of venereal diseases has been lower than for the previous year. No original admissions for syphilis have been made, nor were there any cases of chancroidal infection. There were only 13 admissions for gonococcus infection of urethra, with an annual rate per 1,000 of 73.5. In compliance with instructions contained in Medical Bulletins for Medical Officers, lectures have been given to the crew in regard to sex hygiene and the complications that may arise from venereal diseases.

There has been an increase in the number of admissions for bronchitis (acute) and tonsillitis (acute follicular), but most of these are due to the adverse living conditions of the crew in changing their quarters from the U. S. S. *Culgoa* to the U. S. S. *Arctic* at this season of the year.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "SACRAMENTO," FOR THE YEAR 1921.

During the year there were 8 admissions for malaria, 12 for chancroid, 6 for gonococcus infection, and 4 for syphilis. In view of the fact that this ship was in the Tropics a greater part of the time and the authorities of the ports visited, as a rule, make little if any effort to control venereal disease, it is believed that this is a very low admission rate for the venereal diseases. The crew is instructed as to the danger of exposure and are required to take prophylaxis on their return to the ship. While in malarial districts the ship is screened as completely as is practical.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "PYRO," FOR THE YEAR 1921.

Health conditions on board the U. S. S. *Pyro* were very good, with few exceptions, during the past year. No cases of influenza, measles, scarlet fever, smallpox, cerebrospinal fever, or cerebrospinal meningitis were reported. No diseases of the blood, circulatory system, ductless glands and spleen, eye and adnexa, communicable diseases transmitted by intestinal discharges, diseases of the mind, or tumors were reported.

Four cases of communicable diseases transmitted by oral and nasal discharges were admitted. One case of mumps occurred in a draft reporting aboard this vessel for duty.

There were two cases of tuberculosis (pulmonary), one having been diagnosed when the man had been aboard this vessel but a few days.

The combined venereal disease rate is very high as compared with the previous report. No reasons can be given for this beyond the fact that this vessel has practically a new crew composed of men who have been in the service but a short time. Furthermore, the cruising radius was wide, during which time liberty was granted in ports in which venereal diseases are prevalent.

Diseases of the respiratory tract consisted of 11 cases of tonsillitis (acute follicular), 1 case of sinusitis (maxillary), 1 case of bronchitis (acute), and 2 cases of deviation of nasal septum.

There were 2 cases of hernia (inguinal) reported. Three cases of malaria occurred in a draft from the receiving ship, Hampton Roads, Va. There were 2 cases of disease of the nervous system, 1 case of paralysis of the seventh nerve, and 1 of neuritis (sciatic). There were 2 cases of poisons, 1 of acute alcoholism, and 1 of cocaine.

There were 16 cases of accidents and injuries other than drownings. However, only 4 cases occurred aboard this vessel.

There were no drownings or other deaths aboard during the past year.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "WILKES," FOR THE YEAR 1921.

The general health of the crew for the period covered by this report was very good. Two-thirds of the admissions were due to venereal infection. This persistent menace to the health of the enlisted personnel was and is the outstanding factor we have to constantly guard against and combat. Prophylactic treatment against venereal infection was strongly advocated, and the men were frequently reminded of the dangers of infection. Educational measures were pushed by distributing circulars and pamphlets on venereal disease, posting bulletins, as well as by an educational lecture on the subject of venereal disease. At the two principal "home ports," Newport, R. I., and Charleston, S. C., where the destroyers remained for lengthy periods, prophylactic stations were maintained ashore at the principal Government landings, providing treatment at all hours for those who desired to take prophylaxis. While standing watches at the prophylactic station, it was noted that many of the men availed themselves of the opportunity to take treatment. At the ports prophylactic treatment was provided aboard ship and looked after by corpsmen assigned to such duty. All these precautions, it is believed, greatly reduced the number of infections in certain ports visited. The number of infections aboard this ship were equally divided between New York City and Newport, R. I. Special attention is invited to the fact that every man who developed venereal disease on this vessel failed to take prophylactic treatment, 50 per cent of them being infected while on leave of absence.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "WILLIAMSON," FOR THE YEAR 1921.

Aside from the venereal diseases, the general health of the crew has been excellent. The cause for the high rate for venereal disease was due to the high prevalence of the diseases in all of the European ports visited by the ship during the past year. A venereal locker is located in the crew's head, and the men

have been frequently instructed in the use of prophylactic and warned of the consequences of infection. Most of the men have responded to this appeal, but very frequently 10 to 12 hours elapse between time of first exposure and time of prophylaxis, thus materially lessening the efficiency of the treatment.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL HOSPITAL, WASHINGTON, D. C., FOR THE YEAR 1921.

There has been a marked improvement in the men who have been inducted into the service during the past year over those who were enlisted during the year 1920.

An examination of health records shows that many men still escape smallpox vaccination and typhoid inoculation. Every record received has been carefully examined, and all with no entries were vaccinated or inoculated.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL AIR STATION, NAVAL OPERATING BASE, HAMPTON ROADS, VA., FOR THE YEAR 1921.

The health of the personnel on this station has been excellent. There were very few admissions during the year for communicable diseases, considering the size of the station. A mild epidemic of measles appeared on the station during the month of March, 1921, 21 cases of measles and 1 of German measles being admitted. The entire personnel of the station was inspected at frequent intervals with a view to detecting early cases and having them transferred immediately to the base hospital. As a result, the epidemic soon subsided, there being but three admissions for measles during the following month.

Ringworm appeared on the station in a sporadic form from time to time, and it was necessary to be constantly on the lookout for it, as it spreads rapidly when undiscovered. All cases were placed in a separate barracks building with separate heads and forced to take treatment three times a day.

During February, 11 admissions were recorded for rhinitis (acute). These cases were believed to have been due to climatic conditions, and with an improvement in the weather few further admissions were recorded.

A case of typhoid fever was reported by a civilian physician who was treating an enlisted man from this station while on leave. On investigation by a medical officer and after consultation with the senior medical officer of the base, it was decided that the case was not typhoid fever, as the man was only sick about six days. No Widal test or culture of the blood had been made. There was no examination of feces or urine, and the local health authorities had not been notified as far as could be determined.

About six cases of smallpox appeared in the vicinity of Norfolk and caused a smallpox scare. so that as a safety precaution the entire crew was vaccinated, regardless of previous number of scars.

Athletics seems to be the greatest cause of admissions for injuries. This is especially true of football, which cause 17 admissions during the year. Other forms of athletics such as boxing and baseball were also causative factors of accidents. In spite of this, athletics is greatly encouraged on this station. The station has the winning football team of the fifth naval district, and it is believed that the good effects to the many overbalance the injuries to the few. Injuries directly attributed to aviation were very few considering

the number of men and planes engaged—especially during the bombing of the German ships during the past summer. Only one fatal crash occurred, when a land plane took a nose dive into soft reclaimed land, burying two officers. One officer died as the result of rupture of the liver, while the other received a dislocated hip, from which he recovered. The outstanding accident of the year was the explosion of the Navy dirigible *C–3* when it was about 500 feet in the air. Five persons were aboard, all of whom suffered various degrees of burns of the body, as well as shock. All, however, made splendid recoveries. Several of the personnel have received contusions, lacerations, and bruises due to propellers, cranks, or other parts of planes. A machine gun exploded on a plane while the plane was at an altitude of about 5,000 feet, an officer receiving a severe laceration of the head and injuries to eyes and one ear, necessitating his being surveyed from the service.

The entire crew were given talks and demonstrations on first aid and were shown the use and application of the material in the aviation first-aid box, with which all planes are equipped. First-aid stations with hospital corpsmen in charge are placed at each end of the pier, and an ambulance is kept fully equipped with a "crash" box, consisting of all tools necessary to demolish a plane, if necessary, to rescue a pinned-in-aviator. It also contains an emergency first-aid kit. A medical officer is constantly on hand to accompany the ambulance. At the suggestion of the senior medical officer of the base, the medical officer on watch constantly carries a hypodermic set in his pocket.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL RADIO STATIONS, SAN JUAN AND CAYEY, PORTO RICO, FOR THE YEAR 1921.

Bubonic plague made its appearance in San Juan last February, there being three well-defined cases of the bubonic type, which were later confirmed by laboratory examination. All precautionary measures were immediately taken to protect the personnel of this station, including rat proofing of all buildings. Thirty-three cases of plague with 22 deaths were reported in Porto Rico. No case of human plague has been reported since August, 1921, and no case of rodent plague since September 24, 1921. There have been examined at the insular laboratories 214,375 rats, 92 of which were infected with plague.

Sprue.—There has been one case of sprue since the last report, which was confirmed by the laboratory. All modern measures to combat the disease have been taken in this case, even the administration of the vaccine. In spite of all treatment there was little improvement in this patient, and he had to be invalided north.

Dengue.—One case of dengue developed at this station, the man acquiring the disease in St. Thomas. Immediate isolation prevented the appearance of any new case.

Mumps.—There has been one case of mumps in a straggler, who wandered about the city before reporting in. He was isolated immediately, and no further cases developed. The case was interesting on account of its appearance (with enlarged parotid glands) at the very outbreak of the plague in the island.

Venereal disease still leads in the number of admissions for all causes. However, there has been much less than last year. This is probably accounted for by the better understanding of prophylaxis, by the excellent posters and other literature received from the bureau, and by the encouragement given by our athletic officer to athletic activities.

NOTES FROM THE NAVAL TRAINING STATION, HAMPTON ROADS, VIRGINIA.

Living conditions on this station at the end of 1920 were, of course, very different from living conditions to-day. While the average complement of the station was nearly 12,000 on the former date, it was a trifle less than 4,000 for the latter date. Crowding always tends to increase the propagation of disease conditions. When measles, mumps, diphtheria, and scarlet fever appear in a crowded area, the chances of dissemination are very much greater than when the same area is occupied by one-third that number of individuals, so that, while the figures show a marked improvement in the incidence of illness of various kinds, this improvement can not be entirely placed to the credit of the medical personnel, but much of the credit must be assigned to the less crowded living conditions.

In comparing statistics of the same periods for the two years, the annual rates per 1,000 are given, since these rates take into consideration the variation in complement of the station and give the only absolutely equable basis for comparison:

	Annual rates per 1,000 of personnel.			
	Admissions to sick list.		Sick days.	
	December, 1920	December, 1921	December, 1920	December, 1921
All causes	975.80	772.31	2,293.70	8,054.49
Disease only	949.11	689.45	2,153.31	7,338.41

It will be noted that while the actual admissions to the sick list in December, 1921, for all causes and for disease only are decidedly less than for the corresponding period of 1920, the sick days entailed are very much in excess. The cause for this is quite obvious. In 1920 all men whose illnesses entailed more than a few sick days were transferred to the base hospital, and the sick days were charged against that institution, whereas in the month that has just passed we have taken care of the majority of our own patients, and their sick days have been credited to us.

As indicated in the report for November, a strenuous campaign against cockroaches and other vermin was carried on during the month and with marked success. It is estimated that at least a full barrel of roaches have been killed and swept up. There is not yet full cooperation between the sanitary division and the householders. It has been noted often where we have been called upon to exterminate roaches in kitchens that garbage would be found in the houses, and in some instances unwashed plates containing scraps of food were found scattered throughout the kitchen and pantry. Where householders allow this sort of thing, roaches are bound to accumulate and to return when once exterminated. Absolute cleanliness about the culinary department in any institution is a prerequisite to freedom from insects.

NOTES FROM THE RECEIVING SHIP AT HAMPTON ROADS, NAVAL BASE STATION, NORFOLK, VIRGINIA.

The health of the personnel during the past month can be considered excellent, there having been no admissions of a serious nature. No cases of influenza developed among the personnel during the past month. There were 65

admissions and readmissions to the sick list and 31 patients were transferred to the hospital. Eleven admissions and readmissions out of a total of 65 were due to venereal disease; 3 of whom contracted the disease prior to arrival on this station. Twenty-nine out of a total of 307 sick days were due to venereal disease.

INSTRUCTIONS TO MEDICAL OFFICERS.

Circular letter.
Serial No. 156–1922. DCC: SMS 129733(54).
WASHINGTON, D. C., *January 16, 1922.*

To: All Naval Hospitals.
Subject: Weekly report of Veterans' Bureau patients.
Reference: (*a*) Bureau's telegram of August 18, 1920.
(*b*) Bureau's circular letter No. 56–1920 of September 18, 1920; 129733(54).

1. The above references are hereby revoked.

2. Hereafter the report of Veterans' Bureau patients shall be made by telegraph as soon as possible on Friday morning of each week.

3. The telegraphic report shall contain the following information: Number of Veterans' Bureau patients admitted, discharged, and remaining; number of general, tubercular, or psychiatric patients; number of available beds remaining (this data shall be for the week ending Thursday midnight).

Example: Veterans' Bureau patients admitted, 10; discharged, 6; remaining, 30 (general, 25; tubercular, 4; psychiatric, 1); available beds, 120.

4. Available beds are those assigned to Veterans' Bureau patients which are vacant and available for these patients.

5. If there has been no change from the previous week, a statement to this effect is all that is necessary.

6. There has been much delay in transmission of the weekly report to the Veterans' Bureau owing to remissness in some of the naval hospitals in not forwarding the telegraphic report promptly. It is directed that in the future each hospital promptly send in the report in order to facilitate the transmission of the report of this bureau to the Veterans' Bureau.

7. The Bureau desires a report by letter covering the period from January 1, 1922, to the first report sent in under this circular letter, giving the data requested in paragraph 3.

E. R. STITT.

Circular letter.
Serial No. 157–1922. WSD/JBC 124942–O(13).
WASHINGTON, D. C., *January 17, 1922.*

To: All naval hospitals; sick quarters, Marine Barracks, Quantico, Va.; naval medical supply depots; naval medical school; all naval dispensaries.
Subject: Civilian employees; establishment of base complements.
Reference: (*a*) M. & S. circular letter series No. 84–1921, No. 124942–O(33), March 16, 1921.
(*b*) M. & S. circular letter serial No. 87–1921, No. 124942–O(34), March 21, 1921.
(*c*) M. & S. circular letter serial No. 92–1921, No. 124942–O(42), April 9, 1921.
(*d*) M. & S. circular letter serial No. 116–1921, No. 125884(83), August 15, 1921.
Inclosures: Copies of form for report of authorized complement.

1. By references, it has been directed that the civilian force under the Medical Department be reduced to the lowest number consistent with proper care of the sick and reasonable upkeep of buildings and grounds, and that no employees of any character, except replacements within the reduced numbers, should be taken on without the prior approval of the bureau.

2. Upon the basis that all Medical Department activities are at present operating with the minimum number of employees, the bureau desires to establish for each activity a definite base complement, which shall not be exceeded without specific authority.

3. It is directed, therefore, that each of the activities addressed shall immediately submit a report in triplicate (on attached forms) showing the number of civilians at present employed in each rating. Employees authorized for care of Veterans' Bureau patients will be listed separately from those which constitute the regular complement of the hospital, as will also "temporary" employees authorized for limited periods, and the date of expiration of such authority will be shown. This form, when returned approved, will constitute the base complement of civilian employees, and each activity will be held to that base until modified by the bureau, except that, of course, the numbers can and will be reduced whenever the services of employees are no longer necessary.

4. The hospitals also will report the numbers (by ratings) employed in each of the following departments: Cleaning force (janitors, laborers, etc.), maintenance force (upkeep and repair of buildings), gardener's force (upkeep of grounds, walks, roadways, etc.), power house, machine shop, garage, kitchen and scullery, mess halls, laundry, nurses' quarters.

F. L. Pleadwell, *Acting.*

U. S._____

_____

Date_____

Report of Civilian Force Authorized and now Employed.

HOSPITAL SERVICE.

Rating.	Number employed, naval activities only (regular force).	Number employed, specifically for Veterans' Bureau patients.	Number employed, for limited period, with date of expiration.
Baker			
Chief cook			
First cook			
Second cook			
Dietitian			
Housekeeper			
Maid			
Meat cutter			
Chief mess attendant			
Mess attendant			
Pantryman			
Chief launderer			
First launderer			
Second launderer			
Third launderer			
Total base pay per month			

LABORER, HELPER, AND MECHANICAL SERVICE.

Rating.	Number employed, naval activities only (regular force).	Number employed, specifically for Veterans' Bureau patients.	Number employed, for limited period, with date of expiration.
Janitor			
Laborer			
Helper, general			
Helper, laboratory			
Helper, machinist			
Helper, wood worker			
Helper			
Helper			
Helper			
Laborer, classified			
Stablekeeper			
Teamster			
Boxmaker			
Cementer			
Chauffeur			
Electrician			
Engineman			
Fireman			
Gardener			
Joiner			
Machinist			
Mason			
Packer			
Painter			
Pipefitter			
Plasterer			
Plumber			
Sewer			
Watertender			
Chief mechanic			
Assistant Chief mechanic			
Head mechanic			
Head motor mechanic			
Head janitor			
Head laborer			
Head painter			
Total base pay per month			

CLERICAL SERVICE.

Rating.	Number employed, naval activities only (regular force).	Number employed, specifically for Veterans' Bureau patients.	Number employed, for limited period, with date of expiration.
Supervising clerk			
Head stockman			
Stockman			
Clerk			
File clerk			
Bookkeeper			
Stenographer			
Typewriter			
Telephone switchboard operator			
Messenger			
Store laborer			
Roundsman			
Policeman			
Total base pay per month			

Circular Letter.
Serial No. 158–1922.

HWS: MFD 125561(21).
WASHINGTON, D. C., *1 February, 1922.*

To: All medical officers.
Via: Commanding officers.
Subject: Circular of information.
Reference: (*a*) General Order No. 69, of 16 September, 1921.
(*b*) U. S. Naval Medical Bulletin, March, 1922.

1. Venereal diseases are so injurious to the individual and inflict so much damage on the Navy, both in diminishing efficiency by accumulation of sick days and in lowering morale by creating a numerous body of persons ill disposed toward the Navy by reason of the penalties imposed by existing laws, that the department, after extended consideration of the seriousness of the problem presented, and of the various methods heretofore employed in dealing with it has reached the conclusion that there exists an imperative obligation to neglect no possible means of reducing their incidence.

2. Two points having an important bearing on the continued high venereal disease rate have recently come to the attention of the bureau. One is the statistical demonstration that up to four hours the incidence of disease increases with the time elapsing between exposure and the application of prophylactic measures, prophylaxis being apparently of no value after three hours. The other is that 55.4 per cent of infections are of distant origin—that is, acquired while men are on leave or extended liberty.

3. The value of early prophylaxis having been demonstrated so conclusively it is not considered just that any men should by the circumstance of independent duty, leave, or liberty, be excluded from its benefits. Hence the bureau has decided to authorize medical officers to issue on request compound calomel ointment, a preparation that is effective against both Neisserian and luetic infections in a form adapted to personal application. It is not intended

that the issue of the ointment in portable form should supplant prophylactic measures now in operation, but, on the contrary, should supplement them. In other words, the ointment is designated primarily for use by men who may not be in a position to avail themselves of existing opportunities for prophylaxis. Least of all is it intended that this authorization should result in any relaxation of effort in combating venereal disease along other lines.

4. The preparation will be listed on the Supply Table under the caption, "Hydrargyri chloridi mitis, Unguentum compositum (in collapsible containers)," and will be issued in quantities fixed by an allowance based on complement.

The complete item will be made up as follows:

(*a*) Outer waxed-paper envelope.

(*b*) "Directions for Use," printed on thin waxed paper.

(*c*) A collapsible container, holding 7.5 grams of calomel ointment, the orifice of the container being closed by a slip-on cap of soluble material.

E. R. Stitt.

NOTES CONCERNING COMPOUND CALOMEL OINTMENT.

The preparation mentioned in Medicine and Surgery circular letter No. 158–1922 has the formula:

Calomel	33
Camphor	2
Phenol	3
Anhyd. lanolin	39
Benz. lard	20
Beeswax	3

The efficacy of 33 per cent calomel ointment in preventing luetic infection has been recognized since the publication of Metchnikoff's classic experiments in 1906. Less well known is the observation that an ointment of calomel and lanolin is, with the addition of certain ingredients, perhaps equally effective when applied intraurethrally in preventing Neisserian infections.

Much of the evidence in support of the assertion regarding the efficacy of the ointment in the prevention of infections of the mucosa is derived from published articles (1) and from the experience of several naval medical officers. Principal reliance, however, has not been placed on statistics, since all comparative statistics are influenced by so many unknown factors and by so many recognized factors that can not be evaluated, but on authenticated experimental observations. The bureau has knowledge of 45 individuals, known to have been inoculated with gonococci, all of whom escaped infection by means of prophylaxis administered within a short time. In each case calomel ointment was the prophylactic agent employed.

Regarding silver preparations, the bureau knows of no such conclusive evidence bearing on their prophylactic action, and furthermore considers that their physical characteristics unfit them for use in self-disinfection.

It is scarcely to be expected that by thus affording men opportunity to shorten the period elapsing between exposure and the application of prophylaxis there will result a "zero" incidence in the venereal disease rate. There will always be men who, for one reason or another, will neglect protective measures, and even among those recorded as having availed themselves of the means afforded, absolute prevention of disease is unattainable—mainly for reasons such as—

(*a*) Records erroneous as to fact or time.
(*b*) Multiple coitus.
(*c*) Recrudescence of existing disease.
(*d*) Inefficient application of agents.
(*e*) Ineffectiveness of agents employed.

Consequently the most that can reasonably be hoped for is the attainment of an incidence of 0.8 per cent among those who have taken prophylaxis, 0.8 per cent being the "probability" figure when the time element alone is considered.

The purpose in thus enumerating the several causes possibly operative in preventing the attainment of ideal results is to call attention to the limitations inherent in any method of self-disinfection and to the consequent obligation to continue active instruction in physiology and ethics.

(*a*) Maus. Jour. Mil. Surg., 1910, XXVII, p. 264.
(*b*) Maus. Jour. Mil. Surg., 1910, XXVII, p. 636.
(*c*) Russell and Nichols. Jour. Mil. Surg., 1912, XXXI, p. 214..
(*d*) Bachmann. Jour. Mil. Surg., XXXI, p. 192.
(*e*) Personal communications.

Circular letter.
Serial No. 159—1922.

NLS: EGM 128014(21).
WASHINGTON, D. C., *1 February, 1922.*

To: All medical officers, chief pharmacists, and pharmacists.
Subject: Discontinuance of use of certain paragraphs in manual for the Medical Department, 1917.

1. In advance of the publication of a revised manual for the Medical Department, the use of the following paragraphs in the 1917 manual for the Medical Department, U. S. Navy, relative to hospital corpsmen, will be discontinued:

483.	504 (*c*).	513.	522.
487.	511.	520.	523.
503.	512.	521.	524.

2. Reference to and use of the following paragraphs in the Bureau of Navigation Manual in place of those paragraphs mentioned above is directed:

D–4100 (*b*).	D–4200.	D–4231.	D–4332.	D–5710.
D–4102.	D–4210.	D–4232.	D–4341.	D–6401.
D–4106.	D–4220.	D–4233.	D–4380.	D–6417.
D–4121.	D–4221.	D–4234.	D–4383 (1) (2) (3) (4).	
D–4422 (*a*) (*b*) (*c*).	D 4222.	D–4300.	D–5118 (1) (2).	
D–4123.	D–4230.	D–4331.	D–5700.	

3. Prior to the issuance of a revised form N. M. S. H. C. 1 (Examination Report, Hospital Corps, U. S. Navy), it is directed that the name of the subject "Administration" (par. D–4383 (4) (L) Bunav. Manual) be placed at the top of one of the columns of subjects on each copy of this report forwarded to the bureau where this subject is a part of the examination.

E. R. STITT.

Circular letter.
Serial No. 160–1922.

WSG/T 129733(22).
WASHINGTON, D. C., *February 10, 1922.*

To: All naval hospitals.

Subject: Rehabilitation service: "Trainees"; naval hospital treatment of disabled soldiers, sailors, and marines while under training at navy yard and naval stations.

References: (*a*) Letter from Comdt. Mare Island to department, #30088–21–C, December 29, 1921.
(*b*) This bur's 2d end. on above to Assistant Secretary #132680–D12 (12) January 26, 1922.
(*c*) Department's circular letter SONYD–1–Kr #6000–1121–67, February 1, 1922.

1. The above mentioned circular letter (ref. *c*) is quoted as follows:

"1. The trainees of the Federal Board of Rehabilitation under an act of Congress approved August 9, 1921, became beneficiaries of the Veteran's Bureau. If, during training, they are injured or become sick, they are entitled to treatment by the Veterans' Bureau.

"2. Rehabilitation trainees under training by the Navy at navy yards, naval stations, etc., will be admitted to the nearest naval hospital upon the recommendation of the local district manager of the Veterans' Bureau. The Bureau of Medicine and Surgery will make all necessary arrangements and issue all necessary instructions relative to reimbursement by the Veterans' Bureau for such treatment in naval hospitals.

"3. Commandants of naval districts will transmit this letter to all organizations coming within their jurisdiction.

"4. Chief's of bureaus and offices will transmit this letter to all inspection offices under their jurisdiction.

"5. The Major General Commandant, U. S. Marine Corps, will transmit this letter to all organizations of the U. S. Marine Corps not under the jurisdiction of naval officers. (s) EDWIN DENBY."

2. In accordance with the order given in paragraph 2 of the above quoted letter, rehabilitation trainees under training by the Navy at navy yards and naval stations will be admitted to naval hospitals upon the recommendation of the local district manager of the Veterans' Bureau, if during training they shall be injured or shall become sick.

3. For the purpose of securing reimbursement from the Veterans' Bureau for treatment of trainees in naval hospitals, the quarterly report outlined in bureau's circular letter #129733(54) of October 22, 1920 (Serial No. 63–1920), will be followed with additional language in paragraph two thereof to indicate the number of "days of treatment" given trainees as follows:

"2. The above number of treatment days includes both the days of admission and the days of discharge, *and includes ——— treatment days of trainees authorized by bureau's circular letter #129733(22) of February 10, 1922.*"

4. The directions given in bureau's circular letters #129733(54) of October 22, 1920 (Serial No. 63–1920), and No. 129733 of January 6, 1922 (Serial No. 154–1922), will be followed in all respects in the care, transportation, and burial of trainees, and especially as to telegraphic notifications and preparation of bills of lading.

E. R. STITT.

Circular letter.
Serial No. 161–1922.

NLS:EGM F–3–42022 124842(22).
WASHINGTON, D. C., *February 6, 1922.*

To: All medical officers, chief pharmacists, and pharmacists.

Subject: Preparation and forwarding of Form N.M.S.H.C. 3. Hospital Corps transfer and disposition card.

Reference: (*a*) Bureau of Medicine and Surgery circular letter, serial number 14–20 of 4 March, 1920.

(*b*) Paragrapahs 6401 and 6417, Bureau of Navigation manual.

1. Paragraph 3 of reference (*a*) is hereby canceled.

2. The yellow Hospital Corps transfer and disposition card, fully filled out, will be forwarded direct to the Bureau of Medicine and Surgery, *immediately* upon the occurrence of any change in status or station of a hospital corpsman as noted in the 23 separate cases shown on chart attached hereto.

3. Attention is called to the necessity of forwarding this form promptly in order that the bureau's records may show at all times the ship or station to which a man is attached and his status thereon thus permitting intelligent replies to be made to the numerous inquiries received. The accuracy of the entries on the individual jackets of the men concerned as well as the bureau's records depends entirely upon this form and the roster report of the Hospital Corps.

4. Carelessness in the preparation of this form is the cause of considerable trouble and unnecessary work. In preparing this form all data called for should be given, the surname must be spelled accurately, and the Christian name spelled in full.

E. R. STITT.

INSTRUCTIONS REGARDING FORWARDING OF YELLOW HOSPITAL CORPS TRANSFER AND DISPOSITION CARDS.

FORWARD ARRIVAL (RED-INK) HALF OF CARD, UPON:

1. Enlistment or enrollment.
2. Reenlistment or reenrollment.
3. Extension of enlistment.
4. Reporting from other ship or station, to include—
   (*a*) Men received for further transfer.
   (*b*) Men reporting for temporary duty.
   (*c*) Men returning from temporary to permanent duty.
   (*d*) Men admitted as patients for treatment.
   (*e*) Men returning from unauthorized absence of five or more days, or desertion.
5. Reporting from change of rating (advancement in, reduction in, or change of rating).

FORWARD TRANSFERS (RED-INK) HALF OF CARD, UPON—continued.

6. Admission to sick list of member of crew (hospital corpsman) (if for one week or more).
7. Reporting from sick list of member of crew (hospital corpsman) if reported under subparagraph 6.
8. Placing of member of crew (hospital corpsman) in confinement or awaiting trial.
9. Reporting of member of crew (hospital corpsman) from confinement or awaiting trial.
10. Reporting from charge of civil or Federal authorities.
11. Return from leave of absence (five days or more).
12. Change in status or station of chief pharmacists and pharmacists.

FORWARD TRANSFER (BLACK-INK) HALF OF CARD, UPON:

1. Discharge (termination of enlistment or enrollment for any reason and give character of discharge), death, unauthorized absence of five or more days, or desertion.
2. Extension of enlistment and give length of extension.
3. Transfer to other ship or station, to include—
   (*a*) Men transferred for further transfer. In such cases indicate same, as, "Via R. S. ——— and U. S. S. ———."
   (*b*) Men transferred for temporary duty.
   (*c*) Men transferred from temporary to permanent duty.
   (*d*) Men discharged as patients from treatment.
4. Change of rating (advancement in, reduction in, or change or rating).

FORWARD TRANSFERS (BLACK-INK) HALF OF CARD, UPON—continued.

5. Admission to sick list of member of crew (hospital corpsman) (if for one week or more).
6. Discharge from sick list of member of crew (hospital corpsman) if reported under subparagraph 5.
7. Placing of member of crew (hospital corpsman) in confinement or awaiting trial.
8. Release of member of crew (hospital corpsman) from confinement or awaiting trial.
9. Arrest by civil or Federal authorities.
10. Granting of leave of absence (five days or more).
11. Change in status or station of chief pharmacists and pharmacists.

Circular letter.
Serial No. 162–1922.

WRJ: THC 125884 (21).
WASHINGTON, D. C., *6 February, 1922.*

To: All medical officers.
Subject: Charges made against the appropriation "Contingent, medicine and surgery, 1922."
Reference: (*a*) ALNAV No. six of February 3, 1922.

1. The bureau notes, from an examination of the reports of expenditures, that ships and stations are drawing supplies from the supply officer that should be drawn from the medical supply depot exclusively. The limited amount available under the appropriation "Contingent, medicine and surgery" will not last the balance of the present fiscal year unless these unauthorized expenditures are discontinued.

2. It is directed that no charges be made by ships and stations against the appropriation "Contingent, medicine and surgery," except on approved requisitions or allotments, or upon the occurrence of an unusual emergency.

3. Until the issue of the new supply table, alcohol may be secured through the supply officer as a charge against the appropriation "Medical department."

4. Cleaning material used in the medical department of ships is not a proper charge to medical department appropriations; material should be secured from the "first lieutenant;" the practice of obtaining these supplies from the supply officer on stub requisitions will be discontinued. This does not apply to cleaning material used exclusively by the medical department of hospital ships, which are designated by Navy Regulations as "floating hospitals."

5. The bureau is confronted with a deficiency under "Contingent, medicine and surgery" unless a radical reduction is made in expenditures.

E. R. Stitt.

Circular letter.
Serial No. 163–1922.

WRJ: THC 125884(22).
Washington, *D. C., 11 February, 1922.*

To: All medical officers.
Subject: Budget and accounting system.
References: (*a*) Section 3, article 396, Navy Regulations.
(*b*) Bureau's circular letter No. 132683 (62) of July 25, 1921.
(*c*) Bureau's circular letter No. 125884 (83) of August 13, 1921. (Hospitals only.)
(*d*) Bureau's circular letter No. 125884 (113) of November 17, 1921. (Hospitals only.)
(*e*) Bureau's circular letter No. 125884 (124) of December 29, 1921. (Hospitals only.)

Enclosures: (2).

1. The reports required by references (*b*), (*c*), and (*e*) will be discontinued after the reports for the fiscal year 1922 have been submitted. This letter supersedes reference (*d*) with the exception of the directions relating to the submission of requests for job orders. (Paragraph 3, subparagraphs (*o*) to (*ff*), inclusive.)

2. Reference (*a*) directs that amounts of appropriations be so apportioned by monthly or other allotments as to prevent expenditures in one portion of the year which may necessitate deficiency or additional appropriations to complete the services of the fiscal year for which said appropriations are made.

3. In order that this bureau may lay out, in advance, a program of expenditures, and know the extent to which the actual expenditures and obligations correspond with such program, the system hereinafter described, is established.

4. The purpose of the system is to enable the Surgeon General, as the responsible head of the administration of the Bureau of Medicine and Surgery, to present to the Secretary of the Navy an annual business program which shall contain the necessary information concerning the financial requirements of all the activities under the cognizance of this bureau, in such form as clearly to indicate the application of business principles to the bureau's administrative activities.

5. A uniform system of accounts is essential to the intelligent preparation of a business program. The records of the detailed apportionments and expenditures of money should be kept in accordance with some uniform classification in order that (1) the requirements of the different activities may be fully and readily compared; (2) statements of expenditures for the same objects may be stated in identical language, thus facilitating easy, rapid, and intelligent examination and control; (3) to furnish a basis for the estimates, the appropriation acts, the reporting of financial data—all upon a uniform system; and (4) to enable a sufficiently concrete picture of the total financial operations of the bureau to be assembled in a reasonable compass.

6. To provide a uniform system of accounts it is necessary that a uniform standardized classification for use in all Medical Department activities be established. The essential elements of such classification fall into five groups:

(1) Activity.
(2) Type of activity.
(3) Character of expenditure

(4) Object of expenditure.
(5) Appropriation.

7. The first four of the above classifications bear a progressive relationship to each other—that is, total expenditures of activities would be divided according to type of activity; the expenditures according to type of activity would be divided according to character; and the expenditures according to character would be divided according to object. The fifth classification, by appropriation from which the expenditures are made, would be shown separately in the nature of a recapitulation and the expenditures from each appropriation classified by activity, type, and character.

8. The classification by activity refers to the setting up of all records and accounts separately for each activity; classification by type of activity involves a subdivision of the classification by activity with reference to the Navy nomenclature, i. e., hospitals, ships, and stations; classification by character of expenditures involves a distinction between expenditures for the different classes of supplies and services; and classification by objects of expenditures involves a distinction referring particularly to the class of object or services purchased.

9. The classification by character of expenditures involves the following headings:

(1) Administrative expenses.
(2) Maintenance and operating expenses:
  (*a*) Equipment.
  (*b*) Supplies.
  (*c*) Repairs.
  (*d*) Labor.
  (*e*) Indeterminate.
(3) Plant (first cost).
(4) Expenses chargeable to the Navy as a whole.
(5) Purchase of stock for general issue.

Administrative expenses refers only to the pay of the clerical force; maintenance and operating expenses refers to all expenditures for the operation, repair, upkeep, and replacements necessary for the maintenance of the activity, except such expenditures as could be charged to plant, first cost, which include every expenditure that is a direct charge against new construction; expenses chargeable to the Navy as a whole, refers to expenditures that could not be charged to any one activity, such as care of the dead, care of the insane, etc.; purchase of stock for general issue refers to expenditures made by the supply depots for general issue to the service as a whole.

10. The classification by objects would involve the following headings:

(1) Surgeon's necessaries.
  (*a*) Medicines.
  (*b*) Surgical instruments and appliances.
  (*c*) X Ray.
  (*d*) Laboratory.
  (*e*) Physiotherapy.
  (*f*) Operating room, ward, and sick room equipment.
  (*g*) Special diets.
(2) Civil establishment.
  (*a*) Transportation.
  (*b*) Power house.
  (*c*) Commissary.
  (*d*) Laundry.
  (*e*) Buildings and grounds.
  (*f*) Clerical.
  (*g*) Technical.

(3) Service utilities.
  (*a*) Gas.
  (*b*) Water.
  (*c*) Electricity.
  (*d*) Steam.
  (*e*) Fuel.
  (*f*) Power plant.
  (*g*) Refrigerating plant.
(4) Buildings and grounds.
  (*a*) Buildings.
  (*b*) Grounds.
  (*c*) Furniture.
(5) Commissary.
  (*a*) Subsistence.
  (*b*) Culinary and mess gear.
(6) Laundry.
(7) Transportation service.
  (*a*) Nonpassenger carrying vehicles.
  (*b*) Passenger carrying vehicles.
  (*c*) Feed for animals.
(8) Care of sick on detached duty.
  (*a*) Treatment in other than naval hospitals.
  (*b*) Professional services.
(9) Dental.
  (*a*) Material.
  (*b*) Services.
(10) Care of insane.
(11) Care of dead.
  (*a*) Preparation.
  (*b*) Clothing.
  (*c*) Coffins.
  (*d*) Transportation.
  (*e*) Care of cemeteries.
(12) Books, stationery, and printing.
  (*a*) Books.
  (*b*) Stationery.
  (*c*) Miscellaneous printing.
  (*d*) Printing medical bulletin.
(13) Instruction and investigation.
  (*a*) Hygienic and sanitary investigation.
  (*b*) Sanitary, hygienic, and special instruction.

11. After July 1, 1922, no obligation will be made against any appropriation under the cognizance of the Bureau of Medicine and Surgery without prior approval, except upon the occurrence of some extraordinary emergency or unusual circumstance. In realization of the fact that an extraordinary emergency may arise or unusual circumstance occur in relation to the care of the sick or preservation of property, that could not be anticipated, it is not the intent or policy of this bureau to establish an absolute order that would in any way prohibit the procurement of services or supplies immediately necessary for the care and welfare of the sick; and for funeral expenses.

12. Estimated expenditures for the fiscal year 1923, under each appropriation, accompanied by annual requisitions and statements showing, in such detail and form as may be necessary to inform the bureau, the manner of expenditures of such estimates, will be transmitted, by every medical depart-

ment activity, so as to reach the bureau not later than March 15, 1922. The sample form submitted herewith and the procedure outlined may be modified, if necessary, to meet special conditions of each activity arising in the preparation of the estimates, the purpose being to standardize as far as possible in condensed form the tables relating to estimates.

13. In the preparation of the above estimates the fact must be borne in mind that the appropriations for the fiscal year 1923 will certainly be less than for the current year and the need for economy and retrenchment will be greater than ever before.

14. Beginning with the fiscal year 1923 an allotment card will be prepared in the bureau and forwarded to the activity concerned for every requisition or request approved. This card will show the appropriation to which chargeable; the character of expenditure; the object of expenditure; and the amount that may be expended in a specified time. The amount shown as a monthly or quarterly allotment is not cumulative; will not be exceeded, except for provisions, coal, gas, water, and electricity, or as provided for in paragraph 11; and any saving for the specified period reverts to the bureau for future apportionment.

15. Using the allotment card as a guide, each activity will, at the end of each month, complete and submit a report card for each allotment.

(*a*) A report card will be submitted at the end of each month irrespective of the specified period of allotment. Savings will be reported on the card covering the expenditures for the last month of the specified period of allotment. For example, in the case of a quarterly allotment the report card for the first two months would only show actual expenditures. The card for the last month of the quarter would show the saving.

(*b*) Should the expenditure be made as provided for in paragraph 11, the report card will state the circumstances compelling such action. When the card is received in the bureau an allotment card will be prepared and forwarded to complete the files.

(*c*) In the case of supply depot requisitions, for which no allotment is made, the report will show under "Remarks" the classifications and amounts as shown on the back of "Form B."

(*d*) When a requisition or apportionment is completed, or when for a specified period all obligations are satisfied, the report will show the difference between the estimated and actual cost as a saving.

(*f*) In entering the type of services or supplies, use definite terms. If more than one type of services or supplies are included, state under "Remarks" the amount of each type.

(*g*) Only the actual amounts paid civil employees will be reported as an expenditure.

16. Due to the delay incident to having the "report cards" printed, it is not expected that they will be ready for issue before June 1, 1922. Requests for a supply of these cards will be made to the Medical Supply Depots direct.

E. R. Stitt.

Inclosure. February 11, 1922. WRJ:THC 125884(22).

RELATING TO THE SUBMISSION OF ESTIMATES.

1. Estimates will be based on the least possible amount that will be required for the operation and maintenance of the activity.

2. Possible emergencies will not be considered for the reason that should emergencies be included in the estimates the limited appropriations of the

bureau would be overobligated. The bureau will, in the case of an emergency, authorize an increase in the amount of any allotment.

3. No estimates will be made for supplies to be requisitioned from medical supply depots.

4. Open purchase requisitions will not be submitted for supplies that may be secured from the supply officer, medical supply depots, or on local provision contract.

5. A "Request for allotment card" will be prepared to cover each object of expenditure not covered by open purchase requisition. This card, together with the open purchase requisitions, will give a complete and comprehensive statement as to the requirements of the activity, enabling the bureau to make reductions along comprehensive lines should the amount requested exceed the funds available.

6. To illustrate how the card should be prepared the following example is given:

An allotment is required to secure gasoline and oils for the ambulance service: Under classification by character of expenditures it is found that heading No. 2, Maintenance and operation, subhead (*b*); under object of expenditure heading No. 7, Transportation service, subhead (*a*), would apply and the form would be prepared as follows:

Inclosure February 11, 1922. WRJ:THC 125884 (22).

REQUEST FOR ALLOTMENT.

Place: U. S. Naval Hospital, Washington, D. C.
Subtitle of appropriation: Contingent, M. & S.
Character: (2) Maintenance and operation.
Subhead: (*b*) Supplies.
Object: (7) Transportation service.
Subhead: (*a*) Nonpassenger-carrying vehicles.
Estimated cost: $1,000; period, fiscal year.
Description, reason, references, remarks, etc.
To cover gasoline and oils on stub requisitions.
NOTE. Open purchase requisition submitted to cover purchase of tires and spare parts.

7. In addition to the above a summary sheet will be prepared showing the amount requested under each appropriation.

REQUEST FOR ALLOTMENT CARD.

Place_____
Subtitle of appropriation _____
Character_____
Subhead _____
Object_____
Subhead _____
Estimated cost_____ Period_____
Description, reason, reference, remarks, etc.

SAMPLE ALLOTMENT CARD.

Allotment No. 2815–1.

AUTHORITY FOR EXPENDITURE, BUREAU OF MEDICINE AND SURGERY.

Place: Naval Hospital, Washington, D. C.
Subtitle of appropriation: Naval hospital fund.
Character: (2) Maintenance and operation.
Subhead: (b) Supplies.

Object: (3) Service utilities.
Subhead: (e) Fuel.
Estimated cost: $5,000. Semiannual allotment: $2,500.
Allotment expires: June 30, 1922.
Description, reason, reference, remarks, etc.
Coal to be obtained from local supply officer.
Hauling charges to be included in cost of fuel.
Payment to be made by stub requisition.
Approved: June 30, 1921. By: Chief of Bureau.

SAMPLE REPORT CARD.

Allotment No. 2815–1. Report No. 6.

EXPENDITURES FOR MONTH OF DECEMBER, 1921.

Place: Naval Hospital, Washington, D. C.
Subtitle of appropriation: Naval hospital fund.
Character: (2) Maintenance and operation.
Subhead: (b) Supplies.
Object: (3) Service utilities.
Subhead: (e) Fuel.
Estimated cost: $5,000. Semiannual allotment: $2,500.
Completed (yes or no): Semiannual allotment completed.
Expenditures for month: $800. Total to date: $2,000.
Actual cost: ———. Saving: $500.
Type of services or supplies: Coal.
General remarks: None.

NOTE.—For the first five months no saving would be reported as the period of allotment is six months. Actual cost will not be entered until all obligations are satisfied.

Circular letter.
Serial No. 164–1922.

WSD/JBC 124942–O.

WASHINGTON, D. C., *February 13, 1922.*

To: All naval hospitals (continental limits); naval hospital, Pearl Harbor, T. H.; naval medical school, Washington, D. C.; sick quarters, marine barracks, Quantico, Va.

Subject: Civilian employees; computation of monthly pay.

Reference: M. & S. circular letter, Serial No. 155–1922; No. 124942–O, January 6, 1922, par. 2.

1. Under separate cover, the bureau is forwarding a copy of the "Government salary tables (third edition)," for use in computing the monthly pay of civilian employees. This edition will be of particular help in connection with the pay of excepted employees, as extensions are given covering nearly all rates of pay.

E. R. STITT.

N–5/F/McL 5511–379.

NAVY DEPARTMENT, BUREAU OF NAVIGATION,
Washington, D. C., 27 December, 1921.

Bureau of Navigation Circular Letter No. 43–21.

To: All ships and stations.

1. In reviewing the proceedings of the courts of inquiry and boards of investigation convened to inquire into the circumstances attending the deaths of Anton Huhn, late seaman, second class, U. S. Navy, and John J. Morrill, late seaman, second class, U. S. Navy, on the U. S. S. *Huron*, and of William Sabon, late seaman, first class, U. S. Navy, on board the U. S. S. *Hopkins*, the bureau notes that in each case death was the result of asphyxiation while working in an insufficiently ventilated compartment.

2. The accident on the *Huron*, which occurred in a hold of that vessel in which flour was stored, discloses the fact that carbon dioxide is generated from stored wheat and its products. While the figures showing the exact amount of carbon dioxide generated are not available, the quantity is generally considered small and negligible where the flour is stored in a manner permitting free ventilation; in the absence of ventilation, however, carbon dioxide will accumulate and vitiate the air of a storeroom to a considerable extent, particularly in cases where the amount of unoccupied space in the room is small. The quantity of carbon dioxide thus developed is usually greatly increased if the flour contains a relatively large amount of moisture or if infested with insects, but it may appear in the presence of apparently good flour.

3. The death on board the U. S. S. *Hopkins* occurred in the chain locker of that vessel during the process of tiering the anchor chain. A coat of black boot topping was being applied to the chain on deck, and the men were working in shifts tiering it as it came below. Since the testimony indicates that all usual precautions had been taken to assure the proper ventilation of this compartment, and an accident nevertheless occurred, it seems quite apparent that ordinary precautions are not always adequate to insure safety.

4. The above information is promulgated to the service in order to emphasize the necessity of utilizing every available means properly to ventilate below-deck compartments prior to the entry of personnel, and all commanding officers are therefore directed to take appropriate steps on board the vessels under their command to prevent future accidents of this nature.

PHILIP WILLIAMS,
Acting.

26504–444 D–Mi.
27 JANUARY, 1922.

Navy Department circular letter No. 1–22.

Subject: Changes in naval courts and boards, 1917.

1. The following changes in naval courts and boards, 1917, approved 10 January, 1922, takes effect immediately:

Strike out paragraph 673, page 453, variation 5, Naval courts and boards, and substitute the following:

"Var. 5. We hereby certify that should the above mentioned defect—namely, 2 pounds under standard weight and 1 inch under standard chest circumference be waived, which action is (not) recommended by the board, ———, M. D., is physically qualified for admission to the United States Navy as an assistant surgeon in the Medical Reserve Corps and recommend him for appointment."

/s/ EDWIN DENBY.

N14–PR–GLD 55406–350.

NAVY DEPARTMENT, BUREAU OF NAVIGATION,
Washington, D. C., 27 January, 1922.

Bureau of Navigation circular letter No. 7–22.

To: All ships and stations.

Subject: Social hygiene activities of Bureau of Navigation transferred to Bureau of Medicine and Surgery.

1. The social hygiene section of the morale division of the Bureau of Navigation has this date been transferred to the division of preventive medicine of the Bureau of Medicine and Surgery.

2. All correspondence relating to social hygiene will hereafter be addressed to the Bureau of Medicine and Surgery.

/s/ THOMAS WASHINGTON.

VITAL STATISTICS.

Annual rates, shown in the succeeding statistical tables, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{365}{28}$ or $\frac{365}{35}$ or 12, depending upon whether the period includes 4 or 5 weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

Where no figures appear in a given column, it may be taken for granted that the disease did not occur or, if in reference to hospitals, that no case was admitted.

E. R. STITT.

TABLE NO. 1.—*Monthly report of morbidity from various ships and United States Marines on foreign-shore service.*

ATLANTIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
Month ended Dec. 31, 1921	135	13,785	495	430.9	442	384.8	53	46.1	159	138.4
Month ended Jan. 31, 1922	125	12,703	774	731.2	719	679.2	55	51.9	180	170.4
Average of the rates				581.0		532.0		49.0		154.2

Communicable diseases were reported as follows:

	Malaria.	Pneumonia.	Scarlet fever.	Influenza.
Month ended Dec. 31, 1921:				
U. S. S. Bridgeport		1		
U. S. S. Hulbert				1
U. S. S. Niagara				2
U. S. S. Overton				1
U. S. S. Preble				2
U. S. S. Tacoma	1			
Month ended Jan. 31, 1922:				
U. S. S. Abel P. Upshur				1
U. S. S. Bagley				1
U. S. S. Biddle				1
U. S. S. Blaksley				6
U. S. S. Bridgeport		3		20
U. S. S. Bruce				2
U. S. S. Charles Ausburn		1		
U. S. S. Converse				1

TABLE No. 1.—*Monthly report of morbidity from various ships and United States Marines on foreign-shore service*—Continued.

ATLANTIC FLEET—continued.

	Malaria.	Pneumonia.	Scarlet fever.	Influenza.
Month ended Jan. 31, 1922—Continued.				
U. S. S. Conyngham				3
U. S. S. Cleveland	1			1
U. S. S. Dallas				1
U. S. S. Dixie				49
U. S. S. Graham				10
U. S. S. Hunt				1
U. S. S. Isherwood		1		
U. S. S. Lardner				1
U. S. S. Leary				3
U. S. S. Lebanon				9
U. S. S. Maryland		1		
U. S. S. Nicholson				1
U. S. S. Osborne				1
U. S. S. Porter				1
U. S. S. Reid				1
U. S. S. Sharkey				6
U. S. S. St. Louis				3
U. S. S. Tacoma	3			
U. S. S. Toucey				1
U. S. S. Wyoming		3	1	115
U. S. S. Yukon				2

PACIFIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
Month ended Dec. 31, 1921	93	16,019	513	384.3	448	335.6	65	48.6	126	94.4
Month ended Jan. 31, 1922	103	19,001	906	572.2	857	528.6	69	43.5	158	99.8
Average of the rates				478.4		432.1		46.0		97.1

Communicable diseases were reported as follows:

	Malaria.	Mumps.	Pneumonia.	Influenza.
Month ended Dec. 31, 1921:				
U. S. S. Breeze				1
U. S. S. Camden				1
U. S. S. Champlin				1
U. S. S. Glacier				1
U. S. S. Oklahoma	2			
U. S. S. Mississippi				1
U. S. S. Nanshan		1		
U. S. S. Pennsylvania				1
U. S. S. Prairie	2			
Month ended Jan. 31, 1922:				
U. S. S. Aulick				1
U. S. S. Glacier			1	
U. S. S. Kennedy				11
U. S. S. Texas				75
U. S. S. Vestral				17
U. S. S. Wright				1

TABLE No. 1.—*Monthly report of morbidity from various ships and United States Marines on foreign-shore service*—Continued.

MARINES ON FOREIGN-SHORE SERVICE.

	Number of reports received.	Complement.	Admissions, communicable disease, exclusive of venereal disease.	Annual rate per 1,000.
Month ended Dec. 31, 1921	16	3,584	193	615.0

Communicable diseases were reported as follows:

	Malaria.	Dengue.	Dysentery.	Smallpox.
Field hospital, Fifteenth Regiment, Second Brigade, United States Marine Corps, San Pedro de Macoris, Santo Domingo, Dominican Republic	38	.....	1	.....
All outposts, San Pedro de Macoris, Santo Domingo, Dominican Republic	12	.....	.....	.....
Field hospital, Second Brigade, Santo Domingo City, Dominican Republic	21	10	1	1
Third Regiment, United States Marine Corps, Santo Domingo City, Dominican Republic	17	2	.....	.....
Fourth Regiment, United States Marine Corps, Santo Domingo City, Dominican Republic	15	5	.....	.....
United States Marine Barracks, Azua, Dominican Republic [1]	.....	.....	.....	.....
United States Marine Barracks, Barahoma, Dominican Republic	11	5	.....	.....
United States Marine Barracks Training Center, Santo Domingo City, Dominican Republic	12	27	.....	.....
United States Marine Aviation Force, Santo Domingo, Dominican Republic	.....	.....	.....	.....
First Brigade, Eighth Regiment, Port au Prince, Haiti [1]	.....	.....	.....	.....
Haiti gendarmerie, United States Marine Corps, Port au Prince, Haiti	1	.....	.....	.....
Marine Barracks, St. Croix, Virgin Islands	.....	3	.....	.....
Marine Barracks, St. Thomas, Virgin Islands	.....	.....	.....	.....
Marine detachment, Canaguey, Cuba	6	.....	.....	.....
Marine detachment, Managua, Nicaragua	5	.....	.....	.....
Naval and Marine Corps graves registration service, Paris, France	.....	.....	.....	.....

[1] Report not received for December.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921.*

ATLANTIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. North Dakota	1,174	10	102.21	41.6
U. S. S. Delaware	1,125	8	85.33	47.2
U. S. S. Arkansas	1,200	4	40.00	74.4
U. S. S. Wyoming	1,318	16	145.67	113.9
U. S. S. Texas	1,167	16	164.52	127.4
U. S. S. Kansas	350	.....	.....	128.5
U. S. S. Florida	825	7	101.81	135.4
U. S. S. Galveston	341	3	105.57	137.2
U. S. S. New York	1,146	11	115.18	154.9
U. S. S. South Carolina	339	1	35.39	156.7
U. S. S. Michigan	301	4	159.46	161.8

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

ATLANTIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force—Continued.				
U. S. S. Sacramento	186	3	193.54	173.38
U. S. S. Cleveland	290	2	82.75	198.29
U. S. S. Utah	1,058	36	408.31	206.81
U. S. S. Denver	337	3	106.82	217.09
U. S. S. Dolphin	140	.....	.....	242.42
U. S. S. Niagara	200	.....	.....	305.66
U. S. S. Tacoma	295	13	528.81	335.88
U. S. S. Asheville	163	11	809.81	392.70
U. S. S. St. Louis	424	3	84.90	480.29
Destroyer force.				
U. S. S. Stevens	55	.....	.....	.....
U. S. S. Truxton	95	.....	.....	.....
U. S. S. Bancroft	54	.....	.....	18.18
U. S. S. Toucey	58	.....	.....	18.18
U. S. S. Ellis	57	.....	.....	20.33
U. S. S. McKean	52	1	230.76	20.86
U. S. S. Calhoun	55	.....	.....	30.61
U. S. S. McDougal	79	.....	.....	30.92
U. S. S. Hale	(1)	.....	.....	32.60
U. S. S. Belknap	61	.....	.....	34.28
U. S. S. Sharkey	80	.....	.....	35.50
U. S. S. Osborne	74	.....	.....	36.58
U. S. S. Putnam	57	.....	.....	37.44
U. S. S. Nicholson	49	.....	.....	39.21
U. S. S. Manley	53	.....	.....	40.33
U. S. S. Paul Jones	86	1	139.53	43.08
U. S. S. Osmond Ingram	(1)	.....	.....	45.62
U. S. S. Bell	46	.....	.....	46.69
U. S. S. Worden	63	1	190.47	45.78
U. S. S. O'Brien	50	.....	.....	47.52
U. S. S. Taylor	50	.....	.....	49.86
U. S. S. Hopewell	54	.....	.....	49.93
U. S. S. Downes	52	.....	.....	50.73
U. S. S. Graham	99	2	242.42	50.91
U. S. S. Connor	54	.....	.....	54.05
U. S. S. Schenck	80	.....	.....	55.72
U. S. S. McCalla	54	.....	.....	56.07
U. S. S. Branch	60	.....	.....	56.60
U. S. S. Semmes	78	.....	.....	56.60
U. S. S. Pope	65	.....	.....	57.05
U. S. S. Winslow	59	.....	.....	58.39
U. S. S. Mason	66	1	181.81	59.23
U. S. S. J. K. Paulding	75	.....	.....	60.40
U. S. S. Blakeley	79	1	151.89	60.45
U. S. S. McKee	57	.....	.....	61.06
U. S. S. Herbert	57	2	421.05	62.88
U. S. S. Barney	78	.....	.....	63.25
U. S. S. Meredith	(1)	.....	.....	63.32
U. S. S. W. C. Wood	63	2	380.95	63.71
U. S. S. Dale	61	.....	.....	64.95
U. S. S. Shaw	43	.....	.....	66.66
U. S. S. Wadsworth	58	.....	.....	67.22
U. S. S. Davis	45	2	533.33	68.18
U. S. S. Rowan	46	.....	.....	68.31
U. S. S. Wainwright	55	.....	.....	69.63
U. S. S. Ericsson	59	.....	.....	72.00
U. S. S. Ringgold	54	1	222.22	72.50
U. S. S. Dyer	55	1	218.18	74.65
U. S. S. Foote	50	.....	.....	75.63
U. S. S. Benham	50	.....	.....	75.70
U. S. S. King	59	.....	.....	75.94
U. S. S. Lardner	55	.....	.....	76.55
U. S. S. Thomas	60	.....	.....	77.29
U. S. S. Stewart	88	1	136.36	77.61
U. S. S. Cassin	50	.....	.....	78.94
U. S. S. Ford	91	.....	.....	79.47
U. S. S. Porter	50	.....	.....	82.75
U. S. S. Little	55	.....	.....	83.33
U. S. S. Leary	67	.....	.....	85.24
U. S. S. Goldsborough	65	.....	.....	85.57

[1] No report for December.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

ATLANTIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Destroyer force—Continued.				
U. S. S. Dupont	59			87.84
U. S. S. Lawrence	118			88.23
U. S. S. Breckinridge	57			89.95
U. S. S. Craven	50			90.77
U. S. S. Dickerson	68	1	176.47	91.60
U. S. S. Bush	(1)			91.88
U. S. S. Rodgers	52	2	461.53	94.63
U. S. S. Kalk	54			94.67
U. S. S. Rochester	495	4	96.96	95.07
U. S. S. Bernadou	70	2	342.85	95.10
U. S. S. Gridley	44	1	272.72	95.84
U. S. S. G. E. Badger	64			96.96
U. S. S. Charles Ausburne	75			97.42
U. S. S. Case	76	4	631.57	97.82
U. S. S. Preble	94			100.92
U. S. S. Balch	48			101.05
U. S. S. Barry	80	1	150.00	102.12
U. S. S. Bridgeport	705	7	119.14	102.79
U. S. S. Herndon	61			103.15
U. S. S. Black Hawk	353	4	135.97	105.09
U. S. S. Dixie	605	3	59.50	105.99
U. S. S. Allen	63	2	380.95	106.46
U. S. S. Hopkins	90	1	133.33	106.66
U. S. S. Dahlgren	66			111.19
U. S. S. J. Fred Talbot	57			111.45
U. S. S. Derebola	247	5	242.91	113.85
U. S. S. Cowell	50			115.01
U. S. S. Sigourney	53	2	452.83	118.03
U. S. S. Flusser	62			122.27
U. S. S. Wilkes	40			122.88
U. S. S. Breck	42	1	285.71	126.88
U. S. S. Leonidas	(1)			127.70
U. S. S. Pruitt	100	2	240.00	129.03
U. S. S. Haraden	61	1	196.72	130.79
U. S. S. W. B. Preston	98	2	244.89	130.87
U. S. S. Stringham	59			131.86
U. S. S. Conyngham	50			132.23
U. S. S. Hunt	61			132.45
U. S. S. Maddox	57	1	210.52	133.63
U. S. S. Sicard	100	2	240.00	137.03
U. S. S. Parker	(1)			137.29
U. S. S. Cummings	50			140.35
U. S. S. Hatfield	59			141.29
U. S. S. Peary	95	2	252.63	144.92
U. S. S. Gregory	54	2	444.44	146.56
U. S. S. Robinson	(1)			146.59
U. S. S. Crowninshield	57	1	210.52	148.37
U. S. S. Noa	56			152.72
U. S. S. Abbot	60	1	200.00	157.20
U. S. S. McCook	57			162.40
U. S. S. Biddle	55			163.82
U. S. S. Bagley	60			165.02
U. S. S. Cole	53	1	226.41	167.13
U. S. S. Tillman	78	4	615.38	167.83
U. S. S. Converse	87	1	137.93	167.93
U. S. S. Stockton	51			167.96
U. S. S. Reid	73	2	328.76	171.83
U. S. S. Bainbridge	88	1	136.36	173.07
U. S. S. Gwin	52	3	692.30	174.19
U. S. S. Pillsbury	93			177.51
U. S. S. Hulbert	94			183.36
U. S. S. Kimberly	57	1	210.52	187.01
U. S. S. Clemson	54			187.50
U. S. S. Dallas	96			203.38
U. S. S. Goff	88	2	272.72	205.92
U. S. S. Abel P. Upshur	66			208.39
U. S. S. Billingsley	57	6	1,263 15	213 24
U. S. S. Humphreys	64	1	187.50	213 80
U. S. S. Fairfax	54			254 54
U. S. S. Isherwood	47	1	255.31	268.04
U. S. S. Williamson	123	5	487.80	281.52

[1] No report for Decemi er.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

ATLANTIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Destroyer force—Continued.				
U. S. S. Brooks	(1)	.....	.....	311.43
U. S. S. Caldwell	45	2	533.33	311.68
U. S. S. Satterlee	65	2	369.23	323.55
U. S. S. Overton	123	1	97.56	325.64
U. S. S. Kane	98	.....	.....	448.39
U. S. S. Reuben James	132	6	545.45	463.02
U. S. S. Gilmer	61	.....	.....	520.54
U. S. S. Childs	124	6	580.64	633.99
U. S. S. Sands	125	3	288.00	747.48
U. S. S. McFarland	115	9	939.13	762.74
U. S. S. Sturtevant	(1)	.....	.....	986.63
Miscellaneous.				
U. S. S. Woodcock	(1)	.....	.....	.....
U. S. S. Curlew	44	.....	.....	.....
U. S. S. Fulton	134	.....	.....	(2)
U. S. S. Luce	(1)	.....	.....	.....
U. S. S. Contocook	44	.....	.....	38.70
U. S. S. Swan	(1)	.....	.....	43.79
U. S. S. Quail	48	.....	.....	53.33
U. S. S. Sandpiper	75	.....	.....	59.11
U. S. S. Maumee	112	1	107.14	63.70
U. S. S. Culgoa	218	.....	.....	67.86
U. S. S. Savannah	586	5	102 38	74.61
U. S. S. Algorma	39	.....	.....	76.92
U. S. S. Relief	345	7	243.47	86.33
U. S. S. Owl	58	.....	.....	88.07
U. S. S. Mayflower	188	3	191.48	93.18
U. S. S. Murray	102	1	117.64	96.32
U. S. S. Maury	94	1	127.65	100.55
U. S. S. Bushnell	218	4	220.18	107.11
U. S. S. Labanon	130	.....	.....	108.01
U. S. S. Harding	52	.....	.....	108.43
U. S. S. Bridge	220	1	54 54	109.34
U. S. S. Proteus	167	3	215 56	112.02
U. S. S. Columbia	752	10	159 57	112.06
U. S. S. Brazos	123	.....	.....	116.50
U. S. S. San Francisco	313	6	230.03	118.68
U. S. S. Chewink	48	1	250.00	119.00
U. S. S. Lark	(1)	.....	.....	122 27
U. S. S. Mahan	106	.....	.....	123 88
U. S. S. Hannibal	146	2	164.38	126 24
U. S. S. Mallard	44	1	272.72	127.65
U. S. S. Reina Mercedes	(1)	.....	.....	129 26
U. S. S. Red Wing	60	1	200.00	129 55
U. S. S. Bobolink	50	.....	.....	133 33
U. S. S. Shawmut	320	10	375.00	136 68
U. S. S. Patapaco	32	.....	.....	137.14
U. S. S. Potomac	44	.....	.....	137.93
U. S. S. Prometheus	388.	6	185 56	138 13
U. S. S. Iuka	44	.....	.....	148.14
U. S. S. Teal	63	.....	.....	150.37
U. S. S. Sciota	(1)	.....	.....	162.60
U. S. S. Lansdale	83	1	144 57	167.93
U. S. S. Eagle No. 31	1,019	27	317.95	169.57
U. S. S. Robin	(1)	.....	.....	172.83
U. S. S. Eagle No. 17	580	9	186.20	183 24
U. S. S. Rail	52	.....	.....	185.32
U. S. S. Vireo	55	.....	.....	189.80
U. S. S. Carrabassett	36	1	333.33	205.32
U. S. S. Montcalm	39	1	307.69	238.80
U. S. S. Nereus	182	1	65.93	240.45
U. S. S. Olympia	472	5	127.11	258.80
U. S. S. Vixen	78	3	461.53	265.78
U. S. S. Scorpion	147	2	163.26	315.00
U. S. S. Nokomis	84	4	571.42	391.69

[1] No report for December.

[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

PACIFIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Battleship and cruiser force.				
U. S. S. Nevada	1,082	6	66.54	66.33
U. S. S. Arizona	1,130	4	42.47	70.81
U. S. S. Oklahoma	1,039	10	115.49	71.17
U. S. S. Pennsylvania	1,252	13	124.60	113.27
U. S. S. California	1,459	12	98.69	114.64
U. S. S. New Mexico	1,238	14	135.70	121.26
U. S. S. Mississippi	1,086	9	99.44	127.03
U. S. S. Maryland	1,193	10	100.58	128.38
U. S. S. Idaho	1,062	1	11.29	130.76
U. S. S. Tennessee	1,132	40	424.02	133.41
Destroyer force.				
U. S. S. Coghlan	70	.....	.....	.....
U. S. S. Farenholt	91	.....	.....	.....
U. S. S. Somers	61	.....	.....	.....
U. S. S. Thatcher	41	.....	.....	.....
U. S. S. Chew	34	.....	.....	15.91
U. S. S. Fuller	52	.....	.....	16.04
U. S. S. Claxton	48	.....	.....	18.99
U. S. S. Shubrick	39	.....	.....	19.90
U. S. S. Walker	39	1	307.69	19.96
U. S. S. Marcus	110	.....	.....	20.10
U. S. S. MacDonough	101	.....	.....	20.86
U. S. S. Percival	53	.....	.....	20.94
U. S. S. Williams	35	.....	.....	21.27
U. S. S. Crane	(1)	.....	.....	24.84
U. S. S. Bruce	65	.....	.....	26.03
U. S. S. McLanahan	(1)	.....	.....	31.66
U. S. S. Melvin	97	.....	.....	31.66
U. S. S. Sloat	102	.....	.....	31.83
U. S. S. Charleston	437	1	27.45	32.23
U. S. S. Welles	53	.....	.....	34.13
U. S. S. Sumner	106	.....	.....	34.88
U. S. S. Selfridge	108	.....	.....	35.66
U. S. S. Palmer	(1)	.....	.....	35.82
U. S. S. Crosby	36	.....	.....	36.64
U. S. S. Schley	43	.....	.....	37.67
U. S. S. Ramsay	(1)	.....	.....	39.43
U. S. S. Greene	37	.....	.....	39.60
U. S. S. Young	48	.....	.....	42.17
U. S. S. Laub	(1)	.....	.....	45.36
U. S. S. Doyen	62	.....	.....	45.85
U. S. S. Swasey	32	.....	.....	46.39
U. S. S. Hazelwood	34	.....	.....	46.92
U. S. S. Hull	103	.....	.....	46.96
U. S. S. J. F. Burns	53	.....	.....	47.24
U. S. S. MacLeish	67	.....	.....	47.38
U. S. S. Howard	89	.....	.....	48.87
U. S. S. Gamble	67	.....	.....	50.26
U. S. S. Sinclair	34	.....	.....	50.84
U. S. S. Radford	70	.....	.....	50.95
U. S. S. Kidder	106	1	113.20	51.72
U. S. S. Woodbury	54	.....	.....	55.61
U. S. S. Prairie	487	.....	.....	55.66
U. S. S. Litchfield	65	2	369.23	55.94
U. S. S. Shirk	98	2	244.89	57.69
U. S. S. Chauncey	57	.....	.....	57.97
U. S. S. Lamberton	56	.....	.....	58.19
U. S. S. Stansbury	95	.....	.....	58.82
U. S. S. Farragut	49	.....	.....	59.11
U. S. S. Ballard	35	.....	.....	59.30
U. S. S. Hamilton	63	3	571.42	59.70
U. S. S. Badger	62	1	193.54	59.85
U. S. S. S. P. Lee	54	.....	.....	60.40
U. S. S. Thornton	33	.....	.....	60.83
U. S. S. Renshaw	97	.....	.....	60.85
U. S. S. Hogan	90	.....	.....	61.16
U. S. S. Meade	42	.....	.....	61.45
U. S. S. O'Bannon	100	.....	.....	61.98
U. S. S. Yarborough	93	.....	.....	64.34
U. S. S. Kennison	61	1	196.72	65.71
U. S. S. Edwards	38	.....	.....	67.13

[1] No report for December.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

PACIFIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Destroyer force—Continued.				
U. S. S. Babbitt	(1)			67.79
U. S. S. Nicholas	(1)			67.92
U. S. S. Champlin	33			69.26
U. S. S. Edsall	59	1	203.38	69.56
U. S. S. Meyer	53			70.25
U. S. S. Turner	46			70.79
U. S. S. Parrott	68			73.42
U. S. S. Aulick	59			73.84
U. S. S. Preston	59			73.84
U. S. S. Wood	106	1	113.20	74.34
U. S. S. Reno	62			79.40
U. S. S. Boggs	46			79.64
U. S. S. Melville	424	3	84.90	83.96
U. S. S. Breese	64			86.59
U. S. S. Mullany	100	1	120.00	86.64
U. S. S. Twiggs	(1)			90.14
U. S. S. Tattnall	(1)			92.04
U. S. S. Mervine	102			93.45
U. S. S. Chase	(1)			97.16
U. S. S. Zeilen	48			97.16
U. S. S. MacKenzie	96	1	125.00	98.81
U. S. S. Bulmer	63			99.35
U. S. S. McDermut	48	1	250.00	99.66
U. S. S. Gillis	52			101.18
U. S. S. Moody	36			104.95
U. S. S. Kilty	58			109.23
U. S. S. McCawley	36			113.20
U. S. S. Morris	37			117.35
U. S. S. Evans	37			118.06
U. S. S. McCormick	63			118.51
U. S. S. Tingey	40			118.95
U. S. S. Robert Smith	107	3	336.44	119.19
U. S. S. Buffalo	(1)			124.20
U. S. S. Philip	91	1	131.86	131.21
U. S. S. Paul Hamilton	53			133.90
U. S. S. Simpson	64	4	750.00	134.83
U. S. S. Thompson	62	1	193.54	136.48
U. S. S. Lamson	69	2	347.82	137.14
U. S. S. Montgomery	63	1	190.47	142.08
U. S. S. Bailey	38			144.10
U. S. S. Birmingham	348	2	68.96	147.30
U. S. S. Kennedy	105	1	114.28	147.90
U. S. S. Elliott	32	1	375.00	158.75
U. S. S. LaVallette	120	2	200.00	159.46
U. S. S. Corry	109			160.00
U. S. S. Farquhar	60			162.43
U. S. S. Yarnall	35			163.82
U. S. S. Delong	(1)			164.38
U. S. S. Henshaw	45	1	266.66	166.03
U. S. S. Ward	53	1	226.41	169.49
U. S. S. Delphy	72			170.94
U. S. S. Aaron Ward	31			177.19
U. S. S. Wm. Jones	(1)			205.34
U. S. S. Jacob Jones	(1)			212.38
U. S. S. Stoddert	67			225.44
U. S. S. Wickes	(1)			234.69
U. S. S. Buchanan	41	2	585.36	252.18
U. S. S. Tarbell	36	2	666.66	267.90
U. S. S. Lea	38			294.17
U. S. S. Greer	33			326.53
U. S. S. Upshur	37			417.11
Miscellaneous.				
U. S. S. Lapwing	48			
U. S. S. Sanderling	16	1	750.00	(2)
U. S. S. Vega	65			(2)
U. S. S. Yukon	101			(3)
U. S. S. Burns	100			41.09
U. S. S. Seagull	60	1	200.00	41.09
U. S. S. Tern	51			48.00
U. S. S. Tanager	55			71.32

[1] No report for December.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

PACIFIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Miscellaneous—Continued.				
U. S. S. Baltimore	(1)			72.30
U. S. S. Ingraham	109	1	110.09	74.22
U. S. S. Whippoorwill	(1)			79.47
U. S. S. Anthony	110	3	327.27	81.95
U. S. S. Brant	49			82.19
U. S. S. Vestal	366	4	131.14	91.97
U. S. S. Pinola	49			92.59
U. S. S. Ludlow	105	3	342.85	92.73
U. S. S. Nanshan	(1)			97.95
U. S. S. Sproston	103			99.33
U. S. S. Cardinal	53			100.50
U. S. S. Neptune	184	2	130.43	102.42
U. S. S. Aroostook	690	1	17.39	104.13
U. S. S. Turkey	54			106.95
U. S. S. Partridge	46			112.57
U. S. S. Rappahannock	257	3	140.07	116.41
U. S. S. Cuyama	100	7	840.00	117.93
U. S. S. Kingfisher	45	2	533.33	124.56
U. S. S. Glacier	150	2	160.00	125.98
U. S. S. Kanawha	112	1	107.14	133.25
U. S. S. Sonoma	56			138.92
U. S. S. Eagle No. 11	35			139.30
U. S. S. Jason	223	1	53.81	139.47
U. S. S. Stribling	102	3	352.94	142.01
U. S. S. Penguin	51			142.22
U. S. S. Camden	638	5	94.04	146.30
U. S. S. Connecticut	807	3	44.60	146.39
U. S. S. Mercy	279	1	43.01	174.65
U. S. S. Rainbow	(1)			177.10
U. S. S. Frederick	369	1	32.52	195.12
U. S. S. Gannet	54			196.13
U. S. S. Hancock	128			217.78
U. S. S. Thrush	52	1	230.76	239.08
U. S. S. Pigeon	24			250.00
U. S. S. Swallow	44			466.25

ASIATIC FLEET.

Battleship and cruiser force.				
U. S. S. Albany	272	7	308.82	347.73
U. S. S. Huron	(1)			351.28
U. S. S. New Orleans	339	10	353.98	505.03
Destroyer force.				
U. S. S. Roper	(1)			117.43
U. S. S. Waters	(1)			135.84
U. S. S. Rathburne	(1)			152.34
U. S. S. Talbot	(1)			249.61
U. S. S. J. D. Edwards	(1)			253.07
U. S. S. Dorsey	(1)			265.25
U. S. S. Broome	(1)			286.18
U. S. S. Panther	220			302.41
U. S. S. Chandler	(1)			324.87
U. S. S. Borie	(1)			372.81
U. S. S. Alden	(1)			416.37
U. S. S. Smith Thompson	(1)			432.04
U. S. S. Zane	(1)			433.91
U. S. S. Southard	109			436.36
U. S. S. Barker	48			438.04
U. S. S. Tracy	(1)			531.71
U. S. S. Hovey	(1)			585.13
U. S. S. Long	(1)			709.17

[1] No report for December.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

ASIATIC FLEET—continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Miscellaneous.				
U. S. S. Ajax	(1)			0
U. S. S. Finch	(1)			0
U. S. Submarine Base, Cavite, P. I.	36			0
U. S. S. Piscataqua	(1)			31.08
U. S. S. General Alava	55			57.41
U. S. S. Celtic	(1)			62.64
U. S. S. Wompatuck	39			68.57
U. S. S. Ontario	(1)			119.60
U. S. S. Abarenda	110	1	109.09	141.17
U. S. S. Sara Thompson	84			166.17
U. S. S. R. L. Barnes	(1)			210.06
U. S. S. Avocet	53	1	226.41	210.52
U. S. S. Pecos	115			258.99
U. S. S. Beaver	546	51	1,120.87	259.11
U. S. S. Heron	56	4	857.14	277.45
U. S. S. Quiros	54			291.73
U. S. S. Rizal	112	1	107.14	342.85
U. S. S. Genesee	50			350.51
U. S. S. Villalobos	57	2	421.05	385.91
U. S. S. Bittern	48	1	250.00	410.42
U. S. S. El Cano	(1)			516.51
U. S. S. Hart	90	5	666.66	528.23
U. S. S. Palos	(1)			546.44
U. S. S. Napa	34			571.42
U. S. S. Pampanga	36			602.87
U. S. S. Monocacy	(1)			611.76
U. S. S. Wilmington	194	4	247.42	637.46
U. S. S. Isabel	105	8	914.28	664.20

UNASSIGNED, INCLUDING SHIPS ON SPECIAL DUTY.

Battleship and cruiser force.				
U. S. S. Ohio	395	8	243.03	155.57
Miscellaneous.				
U. S. S. Chaumont	445	2	53.93	(2)
U. S. S. Salinas	101			(2)
U. S. S. Argonne	210	2	114.28	61.53
U. S. S. Falcon	74	1	162.16	91.48
U. S. S. Gulfport	70			94.90
U. S. S. Nitro	237	3	151.89	96.73
U. S. S. Quincy	80			97.16
U. S. S. Caesar	117	1	102.56	108.30
U. S. S. Pyro	304	5	197.36	116.77
U. S. S. Newport News	235	1	51.06	116.85
U. S. S. Kittery	122			117.07
U. S. S. Bath	120	1	100.00	148.72
U. S. S. Houston	111	1	108.10	151.72
U. S. S. Patoka	108			155.08
U. S. S. Orion	220	1	54.54	178.15
U. S. S. Henderson	392	3	91.83	189.94
U. S. S. Neches	133			205.63
U. S. S. Cormorant	(1)			211.53
U. S. S. Pensacola	209	10	574.16	222.33
U. S. S. Sapelo	(1)			230.56
U. S. S. Ramapo	126	4	380.95	236.49
U. S. S. Grebe	54	1	222.22	239.26
U. S. S. Alameda	92	1	130.43	242.31
U. S. S. Saturn	114			246.57
U. S. S. Trinity	111	1	108.10	280.99
U. S. S. Mars	138			382.16

[1] No report for December. [2] First report.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service, December, 1921*—Continued.

U. S. MARINES ON FOREIGN-SHORE SERVICE.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since Jan. 1, 1921.
Second Regiment, First Brigade, United States Marine Corps, Cape Haitien, Haiti	772	26	432.13	364.68
First Provisional Brigade, United States Marine Corps, Port au Prince, Haiti	2,192	77	421.53	431.81
United States Marine Barracks, Barahona, Dominican Republic	51	.....	.....	(1)
Third Regiment, United States Marine Corps, Santo Domingo, Dominican Republic	554	17	368.23	(1)
United States Marine Barracks, Azua, Dominican Republic	59	2	406.77	(1)
First Air Squadron, United States Marine Corps, Santo Domingo, Dominican Republic	165	1	72.72	98.88
United States Marine Barracks, Training Center, Santo Domingo, Dominican Republic	190	8	505.26	162.30
Fifteenth Regiment, Second Brigade, United States Marine Corps, San Pedro de Macoris, Dominican Republic	780	25	384.61	164.74
Fourth Regiment, United States Marine Corps, Santo Domingo, Dominican Republic	839	33	471.99	273.93
Post Dispensary, Marine Barracks, St. Thomas, Virgin Islands	190	3	189.47	118.05
United States Marine detachment, Camaguey, Cuba	296	2	81.08	187.71
United States Marine detachment, American legation, Managua, Nicaragua	124	2	193.54	326.08
United States Marine detachment, American legation, Peking, China	361	8	265.92	404.4

[1] First report.

SUMMARY.

	Annual rate per 1,000, December.			Average rate since Jan. 1, 1921.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	.....	138.75	1,263.15	.....	151.33	986.63
Battleship and cruiser force:						
Atlantic Fleet	35.39	146.37	809.81	41.60	161.73	480.29
Pacific Fleet	11.29	122.33	424.02	66.33	130.07	133.41
Asiatic Fleet	308.82	333.87	353.98	347.73	355.03	505.03
Unassigned, including ships on special duty	243.03	243.03	243.03	155.57	190.80	155.57
Destroyer force:						
Atlantic Fleet	.....	183.92	1,263.15	.....	158.62	986.63
Pacific Fleet	.....	65.54	750.00	.....	84.03	417.11
Asiatic Fleet	.....	.....	.....	117.43	387.90	709.17
Miscellaneous:						
Atlantic Fleet	.....	170.51	571.42	.....	125.20	391.69
Pacific Fleet	.....	92.92	840.00	.....	119.25	466.25
Asiatic Fleet	.....	499.46	1,120.87	.....	348.28	664.20
Unassigned, including ships on special duty	.....	116.23	574.16	61.53	167.16	382.16

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States Marines on foreign-shore service. December, 1921*—Continued.

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, December.		Per cent, since Jan. 1, 1921.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	73.15	7.92	63.90	8.59
Battleship and cruiser force:				
Atlantic Fleet	73.51	5.96	58.55	9.05
Pacific Fleet	89.92	4.20	71.48	6.62
Asiatic Fleet	58.82	17.65	47.59	14.46
Unassigned, including ships on special duty	62.50	.....	58.68	14.88
Destroyer force:				
Atlantic Fleet	80.31	6.30	70.05	6.86
Pacific Fleet	72.73	18.18	77.57	7.32
Asiatic Fleet	.....	.....	45.13	10.49
Miscellaneous:				
Atlantic Fleet	70.94	10.26	68.24	8.30
Pacific Fleet	82.61	13.04	67.96	7.49
Asiatic Fleet	43.59	5.13	52.05	11.29
Unassigned, including ships on special duty	60.53	10.53	63.95	9.53

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the four-week period Jan. 1 to 28, 1922, inclusive.*

VENEREAL DISEASES.

	Total admissions.	Annual rate per 1,000.	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000.
FIRST NAVAL DISTRICT.									
Boston, Mass., navy yard	3	70.27	24.86	.....	.....	3	70.27	.....	.....
Hingham Mass., receiving ship and ammunition depot	4	127.13	108.00	.....	.....	3	95.35	1	31.78
Newport, naval torpedo station	1	16.10	28.50	.....	.....	.....	.....	1	16.10
Portsmouth, N. H., navy yard and naval prison	4	31.92	11.89	.....	.....	3	23.94	1	7.98
THIRD NAVAL DISTRICT.									
Brooklyn, N. Y.:									
Headquarters, naval district	.....	.....	6.23	.....	.....	.....	.....	.....	.....
Navy yard, including marine barracks	3	88.63	37.41	.....	.....	3	88.63	.....	.....
Receiving ship (Bay Ridge)	22	237.93	62.51	3	22.44	14	151.41	5	54.07
New London, Conn., naval submarine base	5	56.52	24.69	2	22.60	3	33.91	.....	.....
FOURTH NAVAL DISTRICT.									
Philadelphia, Pa.:									
Navy yard	.....	.....	31.42	.....	.....	.....	.....	.....	.....
Receiving station	22	236.14	111.77	6	64.40	15	161.01	1	10.73
FIFTH NAVAL DISTRICT.									
Hampton Roads, Va.:									
Naval air station	5	87.71	59.52	1	17.54	4	70.17	.....	.....
Naval training station	35	134.19	28.08	4	15.33	24	92.01	7	26.83
Receiving ship	10	250.96	109.42	2	50.19	6	150.57	2	50.19
Norfolk, Va., navy yard, including marine barracks	15	259.99	45.56	5	86.66	9	155.99	1	17.33
Quantico, Va., marine barracks	48	203.56	50.08	15	63.61	24	101.78	9	38.13
Anacostia, D. C., naval air station	2	131.97	.....	2	131.97	.....	.....	.....	.....
Washington, D. C., marine barracks	2	72.62	.....	1	36.31	1	36.31	.....	.....

TABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the four-week period Jan. 1 to 28, 1922, inclusive*—Continued.

VENEREAL DISEASES—continued.

	Total admissions.	Annual rate per 1,000	Average rate since July 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000
SIXTH NAVAL DISTRICT.									
Charleston, S. C.:									
Navy yard and marine barracks	.....	.....	23.33	.....	.....	.....	.....	.....	.....
Receiving ship	6	264.40	105.28	1	44.06	5	220.33	.....	.....
Parris Island, S. C., marine barracks	7	44.65	17.34	.....	.....	7	44.65	.....	.....
SEVENTH NAVAL DISTRICT.									
Key West, Fla., naval station	.....	.....	24.50	.....	.....	.....	.....	.....	.....
EIGHTH NAVAL DISTRICT.									
New Orleans, La., naval station	9	779.99	134.38	.....	.....	8	693.32	1	86.66
Pensacola, Fla., naval air station	9	146.97	80.32	.....	.....	8	130.64	1	16.33
NINTH NAVAL DISTRICT.									
Great Lakes, Ill., naval training station	9	71.95	50.33	1	7.99	6	47.97	2	15.99
ELEVENTH NAVAL DISTRICT.									
San Diego, Calif., naval air station	1	11.18	11.32	1	11.18	.....	.....	.....	.....
San Pedro, Calif., naval submarine base	1	12.59	45.55	.....	.....	1	12.59	.....	.....
TWELFTH NAVAL DISTRICT.									
Mare Island, Calif., naval station	13	95.53	29.40	.....	.....	5	36.74	8	58.78
San Francisco, Calif., naval training station	16	125.82	38.00	1	7.86	10	78.64	5	39.32
THIRTEENTH NAVAL DISTRICT.									
Keyport, Wash., naval torpedo station	.....	.....	50.50	.....	.....	.....	.....	.....	.....
Puget Sound, Bremerton, Wash.:									
Navy yard, including marine barracks	1	26.97	9.43	.....	.....	1	26.97	.....	.....
Receiving ship	3	195.00	78.01	.....	.....	3	195.00	.....	.....
Total	256	114.35	42.20	45	20 10	166	74.15	45	20.10

TABLE NO. 4.—*Admissions to sick list and admissions rates from various shore stations for the four-week period, Jan. 1 to 28, 1922, inclusive.*

DISEASES AND INJURIES.

	Complement.	Total admissions all causes.	Annual rate per 1,000.	Average rate since July 1.	Total admissions communicable diseases exclusive of influenza.	Annual rate per 1,000.	Average rate since July 1.
FIRST NAVAL DISTRICT.							
Boston, Mass., navy yard	555	25	585.60	237.97	.....	.....	1.67
Hingham, Mass., receiving ship and ammunition depot	409	20	635.68	606.60	.....	.....	1.80
Newport, R. I., torpedo station	807	38	612.14	195.45	1	16.10	3.05
Portsmouth, N. H., navy yard, including naval prison	1,629	45	359.11	143.84	.....	.56	.....
THIRD NAVAL DISTRICT.							
Brooklyn, N. Y.:							
Headquarters, naval district	562	7	161.91	71.71	.....	.....	.....
Navy yard, including marine barracks	440	42	124.08	289.48	.....	.....	.....
Receiving ship (Bay Ridge)	1,202	238	2,573.97	595.26	1	10.81	4.65
New London, Conn., naval submarine base	1,150	48	542.59	344.88	.....	.....	1.59
FOURTH NAVAL DISTRICT.							
Philadelphia, Pa.:							
Navy yard	308	7	295.44	191.43	.....	.....	.....
Receiving station	1,211	100	1,073.42	425.77	1	10.7	3.23
FIFTH NAVAL DISTRICT.							
Hampton Roads, Va.:							
Naval air station	741	43	754.34	318.81	.....	.....	1.00
Naval training station	3,390	243	931.66	238.68	3	11.50	8.89
Receiving ship	518	29	727.78	514.15	1	25.09	10.49
Norfolk, Va., navy yard	750	28	485.32	153.16	.....	.....	3.79
Quantico, Va., marine barracks	3,065	233	988.15	383.90	5	21.20	18.43
Anacostia, D. C., naval air station	197	6	395.92	.....	.....	.....	.....
Washington, D. C., marine barracks	358	21	762.55	.....	.....	.....	.....
SIXTH NAVAL DISTRICT.							
Charleston, S. C.:							
Navy yard and marine barracks	270	2	96.29	86.65	.....	.....	0
Receiving ship	295	25	1,101.67	273.23	.....	.....	22.56
Parris Island, S. C., marine barracks	2,038	36	229.63	83.25	2	12.75	1.73
SEVENTH NAVAL DISTRICT.							
Key West, Fla., naval station	147	3	265.30	49.00	.....	.....	0
EIGHTH NAVAL DISTRICT.							
New Orleans, La., naval station	150	18	1,559.98	517.18	.....	.....	69.22
Pensacola, naval air station	796	36	587.91	348.07	1	16.33	9.26
NINTH NAVAL DISTRICT.							
Great Lakes, Ill., naval training station	1,626	63	503.68	428.73	1	7.99	50.02
ELEVENTH NAVAL DISTRICT.							
San Diego, Calif., naval air station	1,162	27	301.86	236.31	.....	.....	.75
San Pedro, Calif., naval submarine base	1,032	28	352.66	194.20	1	12.59	7.19
TWELFTH NAVAL DISTRICT.							
Mare Island, Calif., naval station	1,769	77	565.84	198.57	.....	.....	.31
San Francisco, Calif., naval training station	1,653	112	880.76	356.21	4	31.45	25.34
THIRTEENTH NAVAL DISTRICT.							
Keyport, Wash., naval torpedo station	157	3	331.20	234.14	.....	.....	0
Puget Sound, Bremerton, Wash.:							
Navy yard, including marine barracks	482	1	26.97	9.43	.....	.....	0
Receiving ship	*200	5	325.00	125.68	.....	.....	0
Total	29,099	1,609	718.74	244.22	19	8.48	10.28

COMMUNICABLE DISEASES REPORTED FROM THE ABOVE-LISTED STATIONS FOR THE FOUR-WEEK PERIOD, JAN. 1 TO 28, 1922, INCLUSIVE.

Cerebrospinal fever.

Total admissions	1
Annual rate per 1,000	.44
Average rate since July 1	.02
Incidence: Naval training station, San Francisco, Calif.	1

Diphtheria.

Total admissions	2
Annual rate per 1,000	.89
Average rate since July 1	.24
Incidence:	
Naval training station, Hampton Roads, Va.	1
Naval training station, San Francisco, Calif.	1

Malaria.

Total admissions	5
Annual rate per 1,000	2.23
Average rate since July 1	3.58
Incidence:	
Naval training station, Hampton Roads, Va.	1
Receiving ship, Hampton Roads, Va.	1
Marine barracks, Quantico, Va.	1
Naval air station, Pensacola Fla.	1
Naval training station, San Francisco, Calif.	1

German measles.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.94

Measles.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.32

Mumps.

Total admissions	6
Annual rate per 1,000	2.68
Average rate since July 1	3.52
Incidence:	
Naval torpedo station, Newport, R. I.	1
Receiving ship, New York	1
Naval training station, Hampton Roads, Va.	1
Marine barracks, Quantico, Va.	1
Marine barracks, Paris Island, S. C.	2

Pneumonia.

Total admissions	2
Annual rate per 1,000	.89
Average rate since July 1	.61
Incidence:	
Marine barracks, Quantico, Va.	1
Naval submarine base, San Pedro, Calif.	1

Scarlet fever.

Total admissions	1
Annual rate per 1,000	.44
Average rate since July 1	.27
Incidence:	
Naval training station, San Francisco, Calif.	1

Tuberculosis.

Total admissions	2
Annual rate per 1,000	.89
Average rate since July 1	.59
Incidence:	
Receiving station, Philadelphia, Pa.	1
Naval training station, San Francisco, Calif.	1

Influenza.

Total admissions	94
Annual rate per 1,000	41.99
Average rate since July 1	7.17
Incidence:	
Headquarters, naval district, New York	3
Navy yard, inc. marine barracks, N. Y.	27
Receiving ship, New York	15
Submarine base, New London, Conn.	3
Receiving station, Philadelphia, Pa.	13
Naval air station, Hampton Roads, Va.	2
Marine barracks, Quantico, Va.	1
Naval training station, Hampton Roads, Va.	10
Naval air station, Anacostia, D. C.	2
Receiving ship, Charleston, S. C.	14
Parris Island, S. C.	1
Submarine base, San Pedro, Calif.	3

Typhoid fever.

Total admissions	0
Annual rate per 1,000	0
Average rate since July 1	.02

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the four-week period, Jan. 1 to 28, 1922.*

Hospitals.	Diphtheria.		Malaria.		German measles.		Measles.		Mumps.	
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.
Annapolis										
Charleston			1	1						
Chelsea			1							
Great Lakes		1								
League Island					1	1		1		
Mare Island			1	1						
Newport									1	1
New York			2				1		1	1
Norfolk			3	1					1	1
Parris Island										1
Pensacola				1						
Portsmouth			1	1						
Puget Sound							1			
Quantico			2	2					1	1
San Diego			1							
Washington										
Total		1	12	7	1	1	2	1	4	5

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the four-week period, Jan. 1 to 28, 1922, inclusive*—Continued.

Hospitals.	Pneumonia.		Scarlet fever.		Tuberculosis.		Influenza.		All causes.		
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Discharged.
Annapolis	3	2					38	94	92	229	170
Charleston	2	4		1		1	45	80	373	316	171
Chelsea	1		1					1	508	335	246
Great Lakes	1	2			2	1			629	413	238
Key West					1				9	8	7
League Island	5				3	3	32	17	278	254	274
Mare Island	1	1			7	4	1		351	205	187
Newport					1				64	41	38
New York	2	7	1	2	16	13	61	71	646	532	440
Norfolk	6	5	1	1	11	6	55	60	358	414	326
Parris Island	1						1	1	37	47	42
Pensacola								1	27	35	42
Portsmouth					4		1	1	36	28	24
Puget Sound					2		12		93	75	67
Quantico	2	1				1			111	112	61
San Diego	1	1			3	1	2	1	270	262	228
Washington	1	2			1				281	172	169
Total	26	25	3	4	51	30	248	327	4,163	3,478	2,730

TABLE No. 6.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the four-week period Jan. 1 to 28, 1922, inclusive.*

Classes.	Navy (complement 109,500).		Marine Corps (complement 22,408).		Total (complement 131,908).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of circulatory system	33	3.92	6	3.48	39	3.84
Diseases of digestive system	417	49.51	121	70.20	538	53.02
Diseases of ductless glands and spleen	3	.36	2	1.16	5	.49
Diseases of ear	67	7.95	22	12.76	89	8.77
Diseases of eye and adnexa	51	6.05	17	9.86	68	6.70
Diseases of genito-urinary system (non-venereal)	137	16.26	29	16.82	166	16.36
Communicable diseases transmissible by oral and nasal discharges	438	52.00	49	29.01	487	47.99
Communicable diseases transmissible by intestinal discharges	2	.24	2	1.16	4	.39
Communicable diseases transmissible by insects and other arthropods	44	5.22	314	182.16	358	35.28
Tuberculosis (all forms)	35	4.16	6	3.48	41	4.04
Venereal diseases	1,090	129.40	280	162.44	1,370	135.01
Other diseases of infective type	216	25.64	72	41.77	288	28.38
Diseases of lymphatic system	41	4.87	17	9.86	58	5.72
Diseases of mind	22	2.61	14	8.12	36	3.55
Diseases of motor system	65	7.72	32	18.56	97	9.56
Diseases of nervous system	31	3.68	17	9.86	48	4.73
Diseases of respiratory system	1,086	128.93	195	413.13	1,281	126.24
Diseases of skin, hair, and nails	87	10.33	32	18.56	119	11.73
Hernia	43	5.10	12	6.96	55	5.42
Miscellaneous diseases and conditions	58	6.89	19	11.02	77	7.59
Parasites (fungi and certain animal parasites)	71	8.43	27	15.66	98	9.67
Tumors	14	1.66	2	1.16	16	1.58
Injuries	450	53.42	91	52.79	541	53.32
Poisons	28	3.32	11	6.38	39	3.84
Total	4,529	537.68	1,389	805.81	5,918	583.22

TABLE No. 7.—*Number of admissions reported by Form F cards for certain communicable diseases and annual rates per 1,000 for the four-week period Jan. 1 to 28, 1922, inclusive.*

Diseases.	Navy (complement 109,500).		Marine Corps (complement 22,408).		Total (complement 131,908).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 8:						
Chicken pox	17	2.02	2	1.16	19	1.87
Diphtheria	5	.59			5	.49
German measles	3	.36			3	.30
Influenza	375	44.52	32	18.56	407	40.11
Measles	2	.24	1	.58	3	.30
Mumps	6	.71	3	1.74	9	.89
Pneumonia, broncho	11	1.31	2	1.16	13	1.28
Pneumonia, lobar	14	1.66	7	4.06	21	2.07
Scarlet fever	4	.47			4	.39
Smallpox	1	.12	2	1.16	3	.30
Class 9:						
Typhoid fever	2	.24			2	.20
Dysentery, bacillary			1	.58	1	.10
Dysentery, entamebic			1	.58	1	.10
Class 10:						
Dengue	14	1.66	90	52.21	104	10.25
Malaria	30	3.56	224	129.95	254	25.03
Class 11:						
Tuberculosis (all forms)	35	4.16	6	3.48	41	4.04
Class 12:						
Chancroid infection	190	22.56	77	44.67	267	26.31
Gonococcus infection	744	88.33	154	89.34	898	88.50
Syphilis	156	18.52	49	28.43	205	20.20
Total	1,609	191.02	651	377.67	2,260	222.72

TABLE No. 8.—*Deaths reported, entire Navy, for the four-week period from Jan. 1 to 28, 1922, inclusive.*

Causes.	Navy (complement 109,500).	Marine Corps (complement 22,408).	Total (complement 131,908).
Cerebrospinal fever	1		1
Pneumonia, broncho	2		2
Pneumonia, lobar	1	3	4
Tuberculosis, chronic pulmonary	1		1
Malaria		2	2
Syphilis	1		1
Other diseases	7		7
Drowning	4	1	5
Accidents and injuries	13	5	18
Poisons	4		4
Total	34	11	45
Annual death rate per 1,000, all causes	4.00	6.38	4.40
Annual death rate per 1,000, diseases only	1.50	2.90	1.80

ORDERS ISSUED TO MEDICAL AND DENTAL OFFICERS AND NURSES.

January 12, 1922:

Lieutenant A. Anderson, Medical Corps, U. S. N. To course of instruction, naval medical school, Washington, D. C.

Lieutenant C. J. Brown, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

January 12, 1922—Continued.

Lieutenant F. C. Hill, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

Lieutenant G. L. McClintock, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

Lieutenant W. P. Mull, Medical Corps, U. S. N. Detached receiving ship, New York, N. Y., to course of instruction, naval medical school, Washington, D. C.

Lieutenant R. A. Nolan, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

January 13, 1922:

Commander R. E. Hoyt, Medical Corps, U. S. N. Detached naval hospital, New York, N. Y., to navy recruiting station, Washington. D. C.

Commander P. S. Rossiter, Medical Corps, U. S. N. Detached second advanced base force, San Diego, Calif., to Navy Department, Washington, D. C.

Lieutenant Commander C. C. Wilson, Medical Corps, U. S. N. Detached receiving ship, Mare Island, Calif., to U. S. S. *Eagle 11.*

Lieutenant L. Humphreys, Medical Corps, U. S. N. Detached navy yard, Washington, D. C., to naval station, Tutuila, Samoa.

Lieutenant A. L. Johnson, Medical Corps, U. S. N. Detached naval station, Tutuila, Samoa, to receiving ship. San Francisco, Calif.

Lieutenant R. L. McMahon, Medical Corps, U. S. N. Detached marine expeditionary force, Haiti, to naval hospital, New York, N. Y.

Lieutenant B .V. D. Scott, Medical Corps, U. S. N. Detached receiving ship, San Francisco, Calif., to duty naval hospital, Great Lakes, Ill.

Lieutenant B. L. Toothaker, Medical Corps, U. S. N. Detached U. S. S. *Nokomis;* resignation accepted effective January 15, 1922.

Lieutenant (Junor Grade) N. F. X. Banyard, Medical Corps, U. S. N. Detached naval hospital, League Island, Pa., to course instruction, naval medical school, Washington, D. C.

Lieutenant (Junior Grade) C. E. Clark, Medical Corps, U. S. N. Detached naval hospital, League Island, Pa., to course of instruction, naval medical school, Washington. D. C.

Lieutenant (Junior Grade) R. E. Duncan, Medical Corps, U. S. N. To course of instruction, naval medical school. Washington, D. C.

Lieutenant (Junior Grade) L. J. Millan, Medical Corps, U. S. N. Detached naval hospital, Newport, R. I., to course of instruction, naval medical school, Washington, D. C.

Lieutenant (Junior Grade) F. M. Moxon, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

Lieutenant (Junior Grade) J. J. O'Connor, Medical Corps, U. S. N. Detached receiving barracks, Hampton Roads, Va., to course of instruction, naval medical school, Washington, D. C.

January 14, 1922:

Lieutenant W. S. Bunkley, Medical Corps, U. S. N. Detached Marine expeditionary force, Santo Domingo, to Nokomis.

Lieutenant C. G. DeFoney, Medical Corps, U. S. N. Detached U. S. S. *Nanshan* to connection with fitting out *Antares* and on board when commissioned.

January 14, 1922—Continued.

Lieutenant B. W. Gaines, Medical Corps, U. S. N. Detached marine barracks, Quantico, Va., to Marine expeditionary force, Santo Domingo.

January 18, 1922:

Commander R. A. Bachman, Medical Corps, U. S. N. Detached U. S. S. *Tennessee* to receiving ship, New York, N. Y.

Commander L. W. Bishop, Medical Corps, U. S. N. Detached U. S. S. *Nevada* to U. S. S. *Tennessee.*

Lieutenant Commander H. L. Brown, Medical Corps, U. S. N. Detached U. S. S. *Texas* to U. S. S. *Nevada.*

Lieutenant Commander G. E. Thomas, Medical Corps, U. S. N. Detached third naval district to U. S. S. *Texas.*

Lieutenant I. B. Polak, Medical Corps, U. S. N. To duty navy recruiting station, New York, N. Y.

Lieutenant (Junior Grade) C. J. Flotte, Medical Corps, U. S. N. Detached receiving ship, Philadelphia., Pa., to naval hospital, Newport, R. I.

Lieutenant Commander R. C. Green, Dental Corps, U. S. N. Detached advance base force, U. S. Marines, San Diego, Calif., to U. S. S. *Prairie.*

January 19, 1922:

Commander G. S. Hathaway, Medical Corps, U. S. N. Detached receiving ship, Mare Island, Calif., to receiving ship, Boston, Mass.

Lieutenant Commander E. E. Woodland, Medical Corps, U. S. N. Detached naval hospital, New York, N. Y., to destroyer squadrons, Atlantic Fleet.

Lieutenant Victor S. Armstrong, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to Medical Research Laboratory and school for Flight Surgeons, Mitchel Field, Mineola, N. Y.

Lieutenant F. J. Carroll, Medical Corps, U. S. N. Detached naval hospital, Newport, R. I., to duty marine expeditionary force, Santo Domingo.

Lieutenant W. A. Epstein, Medical Corps, U. S. N. To duty U. S. S. *Connecticut.*

Lieutenant L. Iverson, Medical Corps, U. S. N. Detached navy recruiting station, Milwaukee, Wis., to Medical Research Laboratory and School for Flight Surgeons, Mitchel Field, Mineola, N. Y.

Lieutenant R. H. Miller, Medical Corps, U. S. N. Detached U. S. S. *Connecticut* to duty sixteenth naval district.

Lieutenant J. F. Neuberger, Medical Corps, U. S. N. Detached navy recruiting station, New York, N. Y., to Medical Research Laboratory and School for Flight Surgeons, Mitchel Field, Mineola, N. Y.

Lieutenant G. R. Petz, Medical Corps, U. S. N. Detached marine expeditionary force, Santo Domingo; resignation accepted.

Lieutenant R. E. A. Pomeroy, Medical Corps, U. S. N. To duty U. S. S. *Baltimore.*

January 23, 1922:

Lieutenant Commander H. W. B. Turner, Medical Corps, U. S. N. Detached U. S. S. *Michigan* to receiving ship, Philadelphia, Pa.

Lieutenant George W. Taylor, Medical Corps, U. S. N. Detached Public Health Service Hospital, Fort Lyon, Colo., to sixteenth naval district.

Lieutenant Carl J. Robertson, Medical Corps, U. S. N. Detached navy yard, New York, N. Y., to Medical Research Laboratory and School for Flight Surgeons, Mitchel Field, Mineola, N. Y.

Lieutenant E. J. Brady, Medical Corps, U. S. N. Detached U. S S. *Charleston* to division thirteen.

January 24, 1922:

Lieutenant F. L. Conklin, Medical Corps, U. S. N. Detached U. S. S. *Frederick* to duty sixteenth naval district.

Lieutenant H. E. Cragin, Medical Corps, U. S. N. Detached Navy recruiting station, Springfield, Mass., to Navy recruiting station, New York, N. Y.

Lieutenant H. P. Krummes, Medical Corps, U. S. N. Detached navy yard, Mare Island, Calif., to U. S. S. *Mercy*.

Lieutenant I. Polak, Medical Corps, U. S. N. To Navy recruiting station, New York, N. Y.

Lieutenant H. J. La Salle, Dental Corps, U. S. N. To marine guard, Peking.

Lieutenant (Junior Grade) R. D. Reid, Dental Corps, U. S. N. To U. S. S. *Beaver*.

January 25, 1922:

Lieutenant Commander G. A. Riker, Medical Corps, U. S. N. Detached receiving ship, San Francisco, Calif., to navy yard, Washington, D. C.

Lieutenant W. F. Crouse, Medical Corps, U. S. N. To duty naval hospital, Norfolk, Va.

January 26, 1922:

Lieutenant F. G. Speidel, Medical Corps, U. S. N. Detached receiving ship, San Francisco, Calif.; resignation accepted effective April 10, 1922.

Lieutenant H. C. Weber, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to sixteenth naval district.

Lieutenant E. A. Jasper, Dental Corps, U. S. N. Detached receiving ship, San Francisco, Calif.; resignation accepted effective January 26, 1922.

Lieutenant (Junior Grade) W. I. Minowitz, Dental Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to U. S. S. *Engle 11*.

January 27, 1922:

Commander M. K. Johnson, Medical Corps, U. S. N. Detached naval torpedo station, Newport, R. I., to home relieved of all active duty.

Lieutenant W. D. Davis, Medical Corps, U. S. N. Detached U. S. Public Health Service Hospital, Fort Lyon, Colo., to duty marine recruiting station, Denver, Colo.

Lieutenant R. E. S. Kelley, Medical Corps, U. S. N. Detached marine recruiting station, Denver, Colo., to duty naval hospital, Great Lakes, Ill.

Lieutenant J. E. Miller, Medical Corps, U. S. N. Detached U. S. S. *Saturn*, to U. S. S. *Arcturus*.

January 28, 1922:

Lieutenant J. C. Adams, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to duty naval hospital, Great Lakes, Ill.

Lieutenant W. E. Beatty, Medical Corps, U. S. N. Detached hospital corps training school, San Francisco, Calif., to naval air station, San Diego, Calif.

Lieutenant J. A. Brown, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to naval hospital, Great Lakes, Ill.

Lieutenant L. L. Davis, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to naval hospital, Great Lakes, Ill.

Lieutenant H. B. LaFavre, Medical Corps, U. S. N. Detached marine recruiting station, Cleveland, Ohio, to navy yard, New York, N. Y.

January 28, 1922—Continued.

Lieutenant C. L. Oliphant, Medical Corps, U. S. N. Detached United States Public Health Service Hospital, Fort Lyon, Colo., to duty naval hospital, Great Lakes, Ill.

Lieutenant (Junior Grade) F. T. Barker, Medical Corps, U. S. N. To duty U. S. S. *Denebola.*

January 30, 1922.

Lieutenant Commander R. F. Sheehan, Medical Corps, U. S. N. Placed on retired list of United States Navy, to home relieved of all active duty.

February 1, 1922.

Lieutenant P. O. Northington, Medical Corps, U. S. N. Detached naval hospital, Chelsea, Mass., to Medical Research Laboratory and School for Flight Surgeons, Mitchel Field, Mineola, N. Y.

Lieutenant T. H. Tabor, Medical Corps, U. S. N. Detached naval hospital, Parris Island, S. C., to duty with marine expeditionary force, Santo Domingo.

February 2, 1922.

Lieutenant H. L. Shinn, Medical Corps, U. S. N. Detached receiving ship, San Francisco, Calif., to duty marine barracks, Quantico, Va.

Lieutenant W. D. Small, Medical Corps, U. S. N. Detached receiving ship, San Francisco, Calif., to duty naval hospital, New York, N. Y.

February 6, 1922.

Lieutenant R. R. Henderson, Medical Corps, U. S. N. Detached torpedo plane squadron, Atlantic Fleet, to torpedo plane squadron one, Atlantic Fleet.

Lieutenant H. L. Wyatt, Medical Corps, U. S. N. Detached U. S. S. *Eagle 11;* to destroyer squadrons, Pacific Fleet.

February 7, 1922.

Commander J. J. Snyder, Medical Corps, U. S. N. Detached fourth naval district to Second Provisional Brigade, U. S. Marines, as brigade surgeon.

Lieutenant Commander W. B. Hotfield, Medical Corps, U. S. N. Detached destroyer squadrons, Pacific Fleet, to duty navy yard, Puget Sound, Washington.

Lieutenant Commander R. H. Holcomb, Medical Corps, U. S. N. Detached navy yard, Boston, Mass., to duty naval ammunition depot, Hingham, Mass.

Lieutenant W. R. Johnson, Medical Corps, U. S. N. Detached navy yard, Pugest Sound, Wash., to U. S. S. *Jason.*

Lieutenant D. W. Registor, Medical Corps, U. S. N. Detached U. S. S. *Vega;* resignation accepted effective March 20, 1922.

Lieutenant H. R. McCleery, Dental Corps, U. S. N. To duty marine barracks, Parris Island, S. C.

February 8, 1922.

Commander R. E. Ledbetter, Medical Corps, U. S. N. Detached brigade surgeon, Second Provisional Brigade, U. S. Marines, to duty Bureau Medicine and Surgery, Navy Department, Washington, D. C.

February 9, 1922.

Lieutenant F. H. Webster, Medical Corps, U. S. N. Detached naval ammunition depot, Hingham, Mass., to duty U. S. S. *Vega.*

February 10, 1922.

Lieutenant Commander R. Cuthbertson, Medical Corps, U. S. N. Detached receiving ship, New York, N. Y., to duty naval hospital, New York, N. Y.

February 10, 1922—Continued.

Lieutenant Commander H. W. B. Turner, Medical Corps, U. S. N. Detached U. S. S. *Michigan*, to continue duty U. S. S. *St. Louis*.

Lieutenant Robert E. S. Kelley, Medical Corps, U. S. N. Detached naval hospital, Great Lakes, Ill., to duty naval hospital, Newport, R. I.

Lieutenant F. N. Pugsley, Medical Corps, U. S. N. To duty naval hospital, New York, N. Y.

The following nurses have been appointed and assigned at the naval hospital at the station indicated:

Charleston, S. C.:

Maple, Ida May, from Louisville, Ky.

Cole, Muriel V., from Charleston, S. C.

Chelsea, Mass.:

Brophy, Catherine, M. D., from Albany, N. Y.

Great Lakes, Ill.:

Beal, Margaret E., from Gary, Ind.

League Island, Pa.:

Hebden, Edith, from Germantown, Pa.

New York, N. Y.:

Johnson, Annie Bertha, from New York, N. Y.

Robinson, Mary L. (Mrs.), from Chadds Ford, Pa.

Portsmouth, N. H.:

Tardif, Phelonise A., from Manchester, N. H.

Portsmouth, Va.:

Harma, Rachel Leona (Mrs.), from Chicago, Ill.

Puget Sound, Wash.:

Pare, Mary Margaret, from Snoqualmie Falls, Wash.

The following nurses have been transferred to—

Canacao, P. I.:

Adams, Bertha A. (via U. S. S. *Argonne*), from Guam.

Northrop, Mary Ellen (via U. S. S. *Argonne*), from Guam.

Johnson, Julia T. (Mrs.) (via U. S. S. *Argonne*), from Guam.

Great Lakes, Ill.:

Croghan, Josephine, from Fort Lyon, Colo.

Wolfe, N. Eva. (Mrs.), from Fort Lyon, Colo.

McBrayer, Coyle, from Fort Lyon, Colo.

Lappin, Carrie H. (chief nurse), from League Island, Pa.

Guam:

Gee, Flora A (via U. S. S. *Argonne*), from Mare Island, Calif.

Pipher, Minnie C. (via U. S. S. *Argonne*), from Mare Island, Calif.

Sanderson, Bess C. (via U. S. S. *Argonne*), from Mare Island, Calif.

League Island, Pa.:

Graham, Bessie C., from Fort Lyon, Colo.

Hoffman, Myn M. (chief nurse), from Fort Lyon, Colo.

Jordan, Lucia D. (chief nurse), from League Island, Pa.

Mare Island, Calif.:

Wertz, Rosa Clifton, from Fort Lyon, Colo.

Adams, Lillian May, from Fort Lyon, Colo.

Reilly, Lillian L., from Fort Lyon, Colo.

Bennett, Janie (via U. S. S. *Argonne*), from Canacao, P. I.

Murphy, Mary Agnes (via U. S. S. *Argonne*), from Pearl Harbor, Hawaii.

Pearl Harbor, Hawaii:
Welsh, Margaret M. (via U. S. S. *Argonne*), from Canacao, P. I.
Distler, Agnes (via U. S. S. *Argonne*), from Guam.
Portsmouth, Va.:
Brennen, Grace, from Washington, D. C.
Williamson, Lottie Grey, from Washington, D. C.
Spann, Pauline J., from Charleston, S. C.
Puget Sound, Wash.:
Janson, Leah Marie, from Fort Lyon, Colo.
San Diego, Calif.:
Martin, Ruth E., from Fort Lyon, Colo.
Graham, Caroline V., from Fort Lyon, Colo.
Hamilton, Annie Galt, from Fort Lyon, Colo.
Washington, D. C.:
Mapes, Daisy M., from League Island, Pa.
Ballard, Miriam F. (chief nurse), from St. Thomas, V. I.
U. S. S. *Relief:*
Farnsworth, Adah L., from Washington, D. C.
U. S. S. *Henderson* (temporary duty):
Scott, Hazel M., from Portsmouth, Va.
Gray, Virginia Lee, from Portsmouth, Va.
Battle Creek Sanitarium, Battle Creek, Mich. (special course in nutrition):
Gemkow, Anne, from Great Lakes, Ill.
Elwell, Ella B., from Great Lakes, Ill.
Fisher, Grace A., from Great Lakes, Ill.
Stewart, Vivant Mary, from Great Lakes, Ill.

HONORABLE DISCHARGES.

Cobb, Adelaide R., January 29, 1922, Fort Lyon, Colo.
Priest, Beulah M., January 18, 1922, Portsmouth, Va.

RESIGNATIONS.

Blanchfield, Mary E., January 15, 1922, Portsmouth, Va.
Dunlap, Besse M., February 1, 1922, Mare Island, Calif.
Finke, Alma E., January 17, 1922, San Diego, Calif.
Grant, Agnes M., January 20, 1922, Washington, D. C.
Shipley, Susan V., February 12, 1922, League Island, Pa.
Whiteside, Florence A., January 22, 1922, Washington, D. C.

The following nurses, United States Naval Reserve Force, in inactive status have been honorably discharged from the service:
Bohart, Ruby M., September 30, 1921.
Borgmann, Bernadine J., September 30, 1921.
Collins, Helen K., September 30, 1921.
Cortelyou, Lillian A., September 30, 1921.
Goodine, Clara G., September 30, 1921.
Gray, Ann, September 30, 1921.
Hall, Adelaide Francis, September 30, 1921.
Henricksen, Marie, September 30, 1921.
Highley, Ethel V., September 30, 1921.
Johnson, Myrtle W., September 30, 1921.
Justesen, Esther, September 30, 1921.

Kreutzinger, Minnie E., September 30, 1921.
Morrow, Frances Lucinda, September 30, 1921.
Mundy, Maude Elaine, September 30, 1921.
Murphy, Juliana J., September 15, 1921.
O'Brien, Anna E., September 30, 1921.
Ryan, Marie, September 30, 1921.
Shelley, Avis Berdena, September 30, 1921.
Sheridan, Mary Elizabeth, September 30, 1921.
Sladek, Henrietta, September 30, 1921.
Theurer, Carolyn, September 30, 1921.

VOL. XVI NO. 4

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INFORMATION OF THE MEDICAL DEPARTMENT OF THE SERVICE

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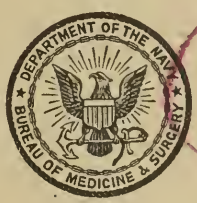
NAVY DEPARTMENT
DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

APRIL, 1922
(MONTHLY)



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Compiled and published under authority of Naval Appropriation Act for 1922, approved July 12, 1921

WASHINGTON
GOVERNMENT PRINTING OFFICE
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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

Owing to the exhaustion of certain numbers of the BULLETIN and the frequent demands from libraries, etc., for copies to complete their files, the return of any of the following issues will be greatly appreciated:

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Volume VII, No. 2, April, 1913.
Volume VIII, No. 1, January, 1914.
Volume VIII, No. 3, July, 1914.
Volume VIII, No. 4, October, 1914.
Volume X, No. 1. January, 1916.
Volume XI, No. 1, January, 1917.
Volume XI, No. 3, July, 1917.
Volume XI, No. 4, October, 1917.
Volume XII, No. 1, January, 1918
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TABLE OF CONTENTS.

Page.

PREFACE v

NOTICE TO SERVICE CONTRIBUTORS vi

SPECIAL ARTICLES:

MEDICAL ASPECTS OF GAS WARFARE.

By Lieutenant G. H. Mankin, Medical Corps, U. S. N 641

THE ALCOHOL QUESTION IN SWEDEN.

By Commander J. S. Taylor, Medical Corps, U. S. N 649

THE SOCIAL SERVICE WORKER AND THE EX-SERVICE MAN.

By Lieutenant J. T. Boone, Medical Corps, U. S. N 653

REVIEW OF THE REORGANIZATION OF THE SANITARY AND PUBLIC HEALTH WORK IN THE DOMINICAN REPUBLIC UNDER THE UNITED STATES MILITARY GOVERNMENT OF SANTO DOMINGO.

By Commander R. Hayden, Medical Corps, U. S. N 657

SOME LESSONS OF THE WORLD WAR IN MEDICINE AND SURGERY FROM THE GERMAN VIEWPOINT.

By Commander W. S. Bainbridge, Medical Corps, U. S. N. R. F 672

HISTORICAL:

JAMES INDERWICK, SURGEON, UNITED STATES NAVY, 1813–1815.

By Captain F. L. Pleadwell, Medical Corps, U. S. N 699

EDITORIAL:

THE THREE HORSEMEN AND THE BODY LOUSE 713

CLINICAL NOTES:

NOTE ON THE USE OF MERCUROCHROME-220 WITHIN THE PERITONEUM.

By Lieutenant Commander Lucius W. Johnson, Medical Corps, U. S. N 717

TEN-SECOND STERILIZATION.

By Lieutenant Commander H. E. Harvey, Dental Corps, U. S. N 717

THE USE OF MERCUROCHROME-220 IN INFECTED WOUNDS.

By Lieutenant W. L. Martin, Medical Corps, U. S. N 718

NOTES ON MOTOR POINTS.

By Commander W. S. Bainbridge, Medical Corps, U. S. N. R. F 719

PROGRESS IN MEDICAL SCIENCES:

TROPICAL MEDICINE.—Treatment of human trypanosomiasis with tryparsamide.—Wassermann reaction in malaria.—Wassermann reaction in malarial fevers.—Rat repression by sexual selection.—Case of tubercular leprosy treated by intravenous injections of stibenyl.—Bismuth-emetine treatment for amebic dysentery and amebiasis.—Malaria incidence on the Canal Zone.—Experiment of leper segregation in the Philippines.—Detection of Lamblia intestinalis by means of duodenal tube.—Balantidium coli and pernicious anemia.—Tropical myositis.—Differential diagnosis of the common intestinal amebae of man.—Contributions to the biology of the Danish culicidae.—Treatment of sleeping sickness.—Bil-

PROGRESS IN MEDICAL SCIENCES—Continued.
Page.
TROPICAL MEDICINE—Continued.
harzia disease treated with tartar emetic.—Iso-agglutination group percentages of Filipino bloods.—Public health in the Dominican Republic 721
CHEMISTRY.—Metabolism of the man of the Tropics.—Disturbances in the development of mammalian embryos caused by radium emanation.—Ammonia content of the blood and its bearing on the mechanism of acid neutralization in the animal organism 735
NOTES AND COMMENTS:
DISPERSION OF FLIES BY FLIGHT.—International Association of the History of Medicine.—Incineration of latrine contents.—Far Eastern Association of Tropical Medicine.—Care of the sick and wounded of the North Russia Expeditionary Force.—Manufacture of soft soap.—the upkeep of rats.—Erratum 739
NURSE CORPS 749
DIGEST OF DECISIONS 759
BOOK NOTICES 763
QUERIES 767
PREVENTIVE MEDICINE, STATISTICS, LETTERS, ORDERS, NEW LEGISLATION, MOVEMENTS OF OFFICERS AND NURSES 769

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

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When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form, such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

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Only the names of actual reviewers for a current number appear.

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U. S. NAVAL MEDICAL BULLETIN

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SPECIAL ARTICLES.

MEDICAL ASPECTS OF GAS WARFARE.

By G. H. Mankin, Lieutenant, Medical Corps, U. S. Navy.

In a former article upon this subject the history and development of gas warfare were discussed with particular reference to the results to be expected, expressed in terms of casualties produced and deaths caused. Very little of the medical aspect of this important subject was discussed at that time. It is therefore the purpose of the writer in the present article to briefly sketch the symptoms, pathology, treatment, and prognosis of poisoning by the more important war gases, as demonstrated by animal experimentation and reports of autopsies upon men dying as a result of the action of these gases.

War gases have been variously classified according to their physiological action, physical characteristics, or according to their chemical composition. Perhaps the most useful and, at the same time, most common classification, from a medical standpoint, is the following:

1. LUNG IRRITANTS.

Examples: Chlorine; phosgene; chlorpicrin; palite; and superpalite.

2. VESICANTS.

Example: Dichlorethyl sulphide (mustard gas).

3. LACHRYMATORY GASES (TEAR GASES).

Examples: Xylyl bromide; benzyl bromide; bromacetone; brombenzyl cyanide; and ethyl iodo-acetate.

4. STERNUTATORY GASES (SNEEZE GASES).

Examples: Diphenyl chlor-arsine; diphenyl cyan-arsine.

No absolute distinction can be made among the different groups, for phosgene, chlorine, and especially chlorpicrin, though primarily lung irritants, are also very effective lachrymators, and, conversely, substances such as brombenzyl cyanide, which, when present in small amounts, cause extreme lachrymation, act, in addition, as lung irri-

tants at higher concentrations. From this it will be seen that no hard and fast rule can be applied with respect to the classification of war gases according to their physiological characteristics. They are, for convenience, put in the group in which their chief and most important action places them.

Generally speaking, all of the gases in a given group will manifest similar actions and produce similar effects; therefore a single description for a particular group will suffice for all of the members in that division.

LUNG IRRITANTS.

Symptomatology.

1. MASSIVE OR FULMINATING TYPE.

Often men were surprised in advance positions, listening posts, front line trenches and dugouts by the explosion of large-caliber gas shells or by gas projectiles during a gas projector attack, and they inhaled an overwhelming amount of gas before being able to put on their masks and died before reaching an aid post.

It is believed that reflex arrest of respiration is a rare accident and that the majority of cases of this type die of an acute massive œdema. One would expect to find reflex respiratory arrest occurring in chlorine poisoning owing to the extremely irritating effect of that gas upon the upper air passages, and since phosgene is less irritant it is believed that a larger amount of this gas would be inhaled without the corresponding choking and coughing observed in chlorine cases. This is actually the case.

In the fulminating type there is a blinding smarting of the eyes, a racking, spasmodic cough. Gasping for breath, cyanosis, and suffering from acute asphyxia caused by the rapidly accumulating fluid in their lungs, the victims drown in their own œdema. As gas defense and gas discipline were improved, this type became quite uncommon.

2. SEVERE TYPE.

The common forms of lung irritant poisoning may well be grouped under this heading.

Probably the first thing noted is the odor of the gas, then an irritation of the throat and eyes, followed by smarting of the eyes and lachrymation. This is most marked after chlorpicrin, less so after chlorine and phosgene. Soon there appears a choking sensation in the throat, accompanied by a sense of constriction and compression in the throat and chest. The man notices a general weakness and a tired feeling, particularly in the knees. Soon a burning and tickling

sensation appears in the upper respiratory passages, succeeded by a tearing spasmodic cough.

If the individual is now removed from the gas the cough grows less and less and the respiratory distress diminishes, and he enters upon a period which is comparatively free from disturbing symptoms other than a general weakness combined with a sensation of rawness in the upper air passages on breathing, and in addition a sense of constriction around the lower part of the chest. The so-called period of remission varies with the different gases in use. After chlorine it may be absent altogether, but it usually lasts an hour or two. After phosgene it is usual for a total or partial remission of symptoms to occur. This has frequently been the basis for the erroneous belief that recovery has been complete. As a result of muscular exercise, particularly, and frequently after chilling, this period has been abruptly terminated, and the so-called third stage, characterized by more or less severe pulmonary symptoms, is ushered in. Cases are by no means infrequent where urgent symptoms and even sudden death preceded by collapse have supervened upon an attempt to perform muscular work some hours after exposure to gas.

In cases of the type mentioned above, it is not at all improbable that pulmonary œdema has been insidiously developing all the while and that any sudden call for extra oxygen, such as work occasions, can not be satisfactorily met. It is also believed that the rise in blood pressure, which occurs during physical exertion, leads to an increased exudation of fluid into the lungs above that caused by the direct effect of the gas.

a. Pulmonary symptoms.—The patient will assume a position which makes it easiest for him to breathe. He brings his accessory muscles of respiration into play in the effort to make air enter his chest. It is common for the face to be cyanotic in chlorine poisoning. In phosgene poisoning it is, however, more common for the face to have an ashen hue. Dyspnœa is always present, and despite the unusual respiratory effort, the expansion of the chest is greatly reduced. Auscultation reveals the presence of various kinds of râles from the subcrepitant type of pulmonary œdema to the sibilant and sonorous râles of acute bronchitis.

Physical signs show great variation, but in general, before secondary infection is manifested, they are those one might expect to be produced by bronchitis, congestion, emphysema, and œdema. In the early stages the sputum is thin, abundant, and often shows tinges of blood. When œdema is established, the fluid flows out of the nose and mouth in enormous quantities. In some cases, however, the œdema is so massive and so sudden in appearance that death intervenes without the occurrence of expectoration. This has been verified at autopsy in numerous instances. With the onset of broncho-

pneumonia, not unusual following lung irritant cases which have been secondarily infected, the sputum becomes thicker, and mucopurulent. Broncho-pneumonia caused in this way takes longer to develop, and when developed it is indicative of serious issue.

Most to be feared, however, is the onset of acute pulmonary œdema. It is a known fact that in fatal cases of chlorine or phosgene poisoning, death occurs, usually, within the first 48 hours. In fact, more than 80 per cent of the fatal cases die within the first 24 hours after exposure to gas.[1] It is, therefore, evident that any procedure intended to ward off a fatal issue must be instituted early.

b. Circulatory system.—The changes in the respiratory system are inseparably connected with those of the circulatory system. In the case of chlorine poisoning, cyanosis and cold extremities indicate, from inspection, that the circulation has become affected. Accurate examination of the heart is difficult owing to the abundance of râles in the lungs and the presence of emphysema. When, however, examination is possible it will be noted that the heart is enlarged, particularly to the right.

The heart action is tumultuous, weak, and irregular, and the heart sounds are poor in quality. It is of considerable importance to make a study of the pulse, as it has prognostic value. In the early stages the pulse is slow, but later it increases in rapidity, particularly where the patient is not kept absolutely quiet. It has been frequently noted in cases where the pulse, despite rest, remains above 100, a fatal outcome is not unlikely. In the case of those patients who are apparently lightly gassed, but whose pulse rate remains high, unusual care to avoid muscular effort and chilling must be taken.

During convalescence the heart is very slow, the rate frequently being 40 to 60. This condition is present only during rest, for any small exertion or emotion is sufficient to run the pulse rate considerably beyond the bounds of the normal. During this period it is necessary to protect the patient from any undue exertion or emotion, otherwise fatal syncope or even failure of the heart may ensue.

With regard to the temperature changes, it is noted that early there is a drop of about 1° C., usually within an hour after exposure to the gas. Underhill[2] states that this is, in all probability, due to the lowered pulse rate and consequent subnormal circulatory efficiency. The temperature increases as does the pulse in the hours after gassing and apparently reaches normal four to six hours afterwards. There is a subsequent rise in temperature above normal, in some cases to a marked degree.

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[1] Douglas, C. G., Jour. R. A. M. C., vol. 35, p. 82.
[2] Underhill, F. P., The Lethal War Gases, p. 15.

After the initial stage, the blood pressure falls and the systolic varies between 90 and 110 mm. Hg. and the diastolic between 60 and 90 mm., giving a diminished pulse pressure.

c. Miscellaneous symptoms.—Vomiting is frequently one of the early symptoms. The vomiting during the period of remission seems to have a beneficial effect upon the subsequent course.

Symptoms which may be referred to the kidneys are generally slight; however, diminution of the 24-hour output or even anuria for 12 hours have been noted. Such occurrences are apparently due to the congestion in the renal area rather than to any change occurring in the renal parenchyma.

Somnolence, fatigue, and headache, dependent probably upon oxygen want, are frequently present; a few cases may show excitation, delirium, restlessness, and hallucinations. These cases are usually alcoholics.

In the first few hours after gassing with phosgene there is a decrease in the concentration of the blood, which is rapidly followed by a tendency of the blood to resume the normal. Accompanying the decreased concentration there is a sharp drop in the chlorides of the blood and a marked decrease in the chlorides and water content of the lungs.

The chlorides of the urine increase with the gassing and are at a maximum about five hours afterwards, gradually dropping off to normal again.

The oxygen-carrying capacity, red blood cells, and hemoglobin follow a curve running about parallel to that expressing the concentration of the blood. Following this period of dilution of the blood there is a period of rapidly increasing concentration far beyond the normal. After this there is a period of gradual blood dilution, in which the concentration returns to normal.

Pathology.

The bodies of the gassed undergo decomposition with unusual rapidity. The exact explanation is not apparent. Cases dying after an overwhelming intoxication show an abundance of frothy fluid escaping from the nose and mouth. The superficial vessels are engorged with blood. The mucosa of the mouth, pharynx, larynx, and trachea is red, congested, and swollen. The epithelial lining shows varying degrees of destruction and desquamation, but not the formation of a fibrinous membrane such as is characteristic of the action of mustard gas. Chlorine causes the death of the epithelial lining of the upper air passages, as can be demonstrated by the use of vital stains. Phosgene, on the other hand, attacks the bronchi, bron-

chioles, and lower air passages, as evidenced by the same method of staining.

The lungs are voluminous and tend to overlap in the mid line. The surfaces are mottled with subpleural hemorrhages and the pleural cavities sometimes contain serosanguineous or serofibrinous fluid. The pleural surface is glossy, stretched, and appears semi-translucent. Along the free margins and external surface are patches of emphysema or, again, the emphysema may be generalized.

On section great quantities of fluid pour from the bronchi and alveoli. Frequently areas of consolidation or infarction are present. When the case has continued for a time the pathology is usually complicated by the presence of areas of secondary pneumonia. They may break down into nodular abscesses.

On minute examination it is noted that the alveolar walls are thickened by œdema, and that the alveoli themselves contain fluid and the débris of disintegrated erythrocytes, leucocytes, and epithelial cells. The characteristic changes of emphysema are seen, the merging of several alveoli through the rupture of their walls and the retraction of the elastic tissue in them. The capillaries are engorged with blood and occasionally a ruptured vessel is noted to have filled air vesicles with blood. Normally the perivascular lymphatics suffice to carry off the lymph from the alveoli, so that drainage just balances production, but in the presence of the great outflow of fluid from the capillaries, caused by the direct action of the gas, even with wide distention of the lymphatics, drainage is insufficient and fluid accumulates.

The pathology of the infectious complications presents no distinctive features and the lesions are similar to such lesions due to causes other than gas.

The heart is usually dilated, particularly the right side.

Aside from the respiratory system, the pathological changes are not unusual, and all can probably be explained on the basis of anoxemia and mechanical interference with the pulmonary circulation.

Course.

Clinical records show that the final outcome of cases of the lung irritant type of poisoning is practically known within 3 days. In fact, 80 per cent of the deaths occur during the first 48 hours. If a patient passes this point, he nearly always survives. The temperature gradually returns to normal, normal respiratory rhythm is restored, and cyanosis diminishes.

In some cases such sequela as chronic bronchitis, asthenia, neurasthenia, dyspnœa, tachycardia, and emphysema remain.

Since the war the medical services have been encumbered and the Veterans' Bureau has been swamped with applications claiming disability incident to exposure to gas during the war. All manner of ills, real and imaginary, have been ascribed to gas. Utmost diligence must be exercised to detect those not entitled to consideration, and equal care must be taken to select those whose claims are valid and place them under the most efficacious treatment which is afforded for their particular ills. It is a significant fact that by far the largest majority of these claims are in connection with affections of the lungs, and rarely with conditions of the heart, with which gas seems, to the lay mind, to have little or no causative relation.

The physical findings in cases showing the late effects of gas poisoning seem to group themselves into three groups, according to Berghoff,[3] who examined 2,000 cases of gas poisoning at Camp Grant, Ill. The average length of time after gassing was four months. It is questionable whether or not the cases had become stationary at that time. However, the grouping is useful in considering the prognosis. The three groups are as follows:

1. Normal group: No physical signs, only the complaint of cough and shortness of breath on exertion.

2. Bronchitic group: This group includes 30 per cent of all cases examined. The physical signs do not differ materially from those of ordinary subacute and chronic bronchitis. Breathing is harsh and high pitched throughout. Expiration is prolonged and at times interrupted. This is most pronounced after exercise. Moisture is abundant. There are coarse, moist râles all over the chest, but pronounced over the bronchial trunks and at the bases. Occasionally, at the apices, there are fine, moist râles, which disappear on coughing.

3. Emphysemic group: This includes about 22 per cent of the cases of the series. The chest seems moderately rigid, movements are restricted, and expansion is impaired. Accessory respiratory muscles are frequently called into use. Tactile fremitus is diminished or absent. Hyperresonance is noted on percussion. Breath sounds over the entire lung area, except the bronchial tree, are diminished in intensity.

Berghoff and his associates conclude, from the examination of the 2,000 cases, that gas victims do not show marked predisposition to tuberculosis, or toward the reactivation of an old lesion; that gas victims present little evidence of material lung tissue damage; and that gas victims of the emphysemic group have a longer convalescence than those of the bronchitic group.

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[3] Berghoff, R. S., Arch. Int. Med. Vol. 24, p. 683.

The majority of the English writers are of the opinion that only a small percentage of those affected by gas during the war will suffer permanent disability. By them it is considered that the pain in the chest on exertion, spasmodic cough, vomiting, dyspnœa, tachycardia, and the so-called D. A. H. (disordered action of the heart—Lewis's effort syndrome) are functional in character and are sequela of all types of war-gas poisoning. For these conditions, lapse of time, graduated exercises, and other appropriate measures will undoubtedly effect a cure.

Treatment.

The ordinary conception of the cause of death in gas poisoning by the lung irritant gases is that it is due to œdema of the lungs, aided by the accompanying congestion. Due to recently published work, particularly along the line of animal experimentation, reasonable doubt has been cast upon this feature as the sole or even the main cause of death in these cases. The quantity of fluid present in the lungs may reach a high figure and such a view as to the cause of death seems quite natural. The most obvious condition other than œdema, which could lead to a fatal issue, is the concentration of the blood. Of course, the two conditions are closely related and interdependent. Winternitz, of Yale University, has shown that large amounts of normal saline solution may be introduced directly into the lungs of normal dogs without producing death. It has been said that œdema is the cause of death, operating by producing asphyxia. In these cases the administration of oxygen should save the animal, provided the oxygen is absorbed. Such experiments with gassed dogs have been carried out and, frequently, though the oxygen in the arterial blood may be maintained in the higher normal limits, death occurs.

Blood concentration means an inefficient oxygen carrier, oxygen starvation of the tissues, failing circulation, and lowered temperature. Where treatment has been successful in maintaining the concentration within the normal limits, the outcome has been favorable in spite of the fact that the lungs may be very œdematous. Administration of oxygen, when the concentration of the blood has been practically normal, makes recovery easier, but it has little effect when the blood is concentrated.

Venesection is recommended in conditions involving pulmonary œdema and congestion, with infusion of saline solution where large amounts of blood have been withdrawn. This procedure has been proven to not aggravate the condition and it does dilute the injurious products of the blood.

Administration of alkali is indicated where acidosis is present.

The prescribed method, suggested by Winternitz[4] after much experimental work, may be stated somewhat more specifically.

1. Venesection, involving 1 per cent of the body weight at any time up to four hours after gassing, is beneficial.

2. Intravenous infusion of warm, sterile, isotonic (0.97 per cent) saline solution, equal in volume to the blood withdrawn, is given when it is evident that the blood is becoming concentrated, as determined by a hemoglobinometer.

3. Administration of $NaHCO_3$ by stomach tube, 5 to 10 grams in 50 to 200 c. c. of water. Treatment to be carried out from one-half to two hours after gassing.

4. Bodily warmth must be maintained at all times. This is extremely important.

In a subsequent article it is proposed to discuss the medical aspects of gas warfare as exemplified by the vesicant group of war gases, with special reference to the symptomatology, pathology, and treatment of mustard-gas poisoning.

THE ALCOHOL QUESTION IN SWEDEN.

By J. S. Taylor, Captain, Medical Corps, United States Navy.

Sentiment in Sweden regarding the rights of the individual as against the collective interests of society in the matter of alcoholic consumption is divided, but an attempt has been made to so regulate the use of alcoholic beverages as to steer a middle course between absolute prohibition and the unrestrained consumption of them.

Under the system of regulation now in vogue the consumption of spirituous liquors amounted to 9,500,000 liters, the consumption of wines to 1,120,000 liters for the period January to March, 1920. In the year immediately preceding the World War, when restrictions on the sale of alcohol were imposed only in a limited area of the country, the total sale of spirituous liquors amounted to 10,000,000 liters and of wines to 1,250,000 liters for the same January to March period. In 1921 the corresponding figures for the same months were 8,200,000 and 730,000, respectively.

The recorded cases of drunkenness throughout Sweden for January to March, 1913, were 15,000; for January to March, 1920, 12,000; for January to March, 1921, 6,800. The system would therefore appear to have produced distinct and permanent good, though it was not universally applied throughout the country until 1919, the preliminary experiment having been made in the city of Stockholm alone in 1914.

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[4] Winternitz; Pathology of War Gas Poisoning, Yale Univ. Press.

From the beginning of the nineteenth century restrictive measures of a partial character were inaugurated under what was known as the Gothembourg system. This system assigned the sale of liquor to certain licensed private corporations, whose profits were restricted to 5 per cent on the capital invested, the excess revenues accruing to the State and to the treasuries of local boroughs. Local authorities appointed three members, the local company appointed two members, of the administrative board. The intention of the Gothembourg system was to dissociate the sale of liquor from private interests and to transfer a preponderating influence in the matter to representatives of the public. The results were the elimination of some of the places where liquor was sold and the establishment of a number of good, moderate-priced restaurants. On the other hand, the private companies were in no way hampered by restrictions as to maximum profits. Furthermore, every individual could purchase liquor to any amount. The inefficacy of the Gothembourg system was demonstrated by the actual increase of alcoholism in the country under its operations.

It was this general situation which led Dr. Ivan Bratt, a physician of Stockholm, to criticize with severity the Gothembourg system, especially as carried out by the concessionaires for the city of Stockholm. Following Dr. Bratt's strictures upon the method in vogue, his scheme for a Stockholm system, administered by the society he organized, received the support of the municipal council in 1914. The plan was voluntarily adopted in some other localities, became the law of the land in 1917, and was in full operation everywhere by 1919.

Briefly summarized, the Bratt or Stockholm system is as follows: The sale of all beverages containing over 3.6 per cent alcohol is strictly regulated. The sale of beverages to be taken home, which in Sweden constitutes the most important feature of the liquor trade, is forbidden to private individuals and restricted to licensed companies, the license being granted by local authorities for periods ranging from one to three years. These companies are limited to 5 per cent dividends, and excess profits revert to the State. The operations of the companies are regulated by a central Government department.

A person desiring to purchase alcoholic beverages applies to the local society where he lives, stating name, age, occupation, size of dwelling, number in his family and whether he has paid his legal dues and is or is not in receipt of public charity. Such data are for determining the applicant's situation in regard to society at large. The local company may investigate further if it so desires. Any individual arrested for drunkenness or other offense constituting a

legitimate ground for suspension of the privilege to buy liquor must be reported to the local company.

An applicant for purchase privileges is registered with the local company, even if his application has been rejected, and all necessary data in his regard are likewise filed. Should the company grant the right to purchase liquor, the applicant is furnished with a pass book bearing a number corresponding to that assigned him on the company's books and at the local sales depository. His purchase is made on presentation of a signed coupon which he cuts out of his pass book. Each coupon must bear his signature and tally with the signature filed with the company. The pass book and the records at the sales depot are stamped so as to show the quantity purchased. The maximum quantity allowed for one individual is 4 liters per month. Under certain circumstances the amount allowed may be increased by the company, and, on the other hand, the company may reduce it, and indeed is required to do so when it sees fit. But the quantity of wine allowed is not fixed. As a rule a pass book is issued either to a man or his wife, not to both. If there is an adult son in the family he, too, may have a pass book, but the amount allowed him is smaller. When there is evidence that the holder of a pass book abuses his privileges in respect to alcohol the book may be withdrawn or the right to purchase is otherwise modified with a view to reducing the temptation to fresh abuses.

The purpose of the system is to make the companies cognizant of the conduct of their patrons so as to determine whether or not they make proper use of the alcoholic beverages purchased. The companies and the local authorities collaborate toward this end. A special local commission is charged with the duty of caring for consumers incapable of ordering their lives properly and must restrain them, if necessary, in asylums and hospitals.

In respect to alcoholic beverages to be consumed at the place of purchase, instead of being taken home, the companies have the right to grant licenses to local dealers, i. e., restaurant keepers. The license is for not more than one year at a time and imposes certain restrictions as to charges, etc., intended to protect the consumer and to make the holder chiefly interested in the sale of food and non-alcoholic drinks. Alcoholic beverages are dispensed in very small amounts ($7\frac{1}{2}$ to 15 centiliters) and only in connection with a bona fide sale of food.

Finally, there is provision for wholesale handling of liquor by a company organized and controlled along the same lines as those provided for the retail trade.

The operation of the Bratt system is best exemplified by the results in Stockholm, where it has been under trial longer than else-

where. The consumption of alcohol has been progressively reduced, dropping from 24 liters per capita in 1913, to 17.8 in 1914, 16.2 in 1915, and 13.7 in 1916. In these years the cases of drunkenness have also decreased, the annual figures being 17,696, 11,878, 11,323, and 9,877. The cases of dipsomania under institutional treatment were reduced from 436 to 200, to 246, to 104, in successive years.

Some remarkable and unforeseen developments resulted from the circumstances of the war and the food embargo and very nearly rendered Dr. Bratt's scheme ineffective. The supply of alcohol being insufficient, the allowed ration had to be greatly reduced. This lowered the legalized consumption (4.3 liters per capita for 1917 and 3.3 liters in 1918) and drunkenness became less at first, only to be followed by a sharp rise at the end of 1917, the figure reaching 6,341 in 1918, due to the illicit, clandestine traffic and to the home distillation which sprang up.

In spite of gradually increasing authorized sales toward the end of 1919, the cases of drunkenness reported reach the figure 11,282. More normal conditions were resumed in 1920 with the regulation of sales by the Stockholm company, and while the per capita issue reached 12.5 liters (half what it was in 1913) the cases of alcoholism did not exceed 10,207.

A still further improvement is noted for the period January to May of the year 1921. If we call the cases of intoxication for January to May, 1913, 100, the corresponding figures for same period in 1920 and 1921 are 77 and 32, respectively, a final reduction of 68 per cent. Calculated in the same way, the reduction of alcoholics requiring treatment in institutions is reduced 61 per cent.

In spite of this very favorable showing for the operations of the system, it has to be noted that coincidently with the increased legalized sale of alcohol there has been also an increase in the so-called offenses or crimes of drunkenness.

In concluding this sketch of the handling of the alcohol question by the Swedish Government, reference should be made to the law of 1913, put into effect in 1916, which provides that persons addicted to alcohol shall be interned in an institution for a maximum of a year (or of two years if there is a record of previous internment for as much as six months) if convicted:

1. Of being a menace to himself or the lives of others.
2. Of neglecting or exposing to hardship dependent wife or children.
3. Of being a public charge or dependent on his family for support.

It is interesting to note that Dr. Ivan Bratt, the distinguished initiator of these notable reforms, considers that modern opinion lays too much stress on alcoholism as a disease and not enough on the mere habit feature—the habit of drinking and the habits that develop

n consequence. Speaking in Paris before a recent meeting of the League against alcohol," Dr. Bratt declared that the chronic alcoholic was mainly the victim of weak will and overwhelming temptation due to laxity of public opinion about excessive drinking. Dr. Bratt seems to consider that a properly devised and effectively administered program of restriction acts to elevate public sentiment. He says: "In Sweden we consider the legitimate trade in alcoholic liquors as an effective instrument when it is correctly used to keep out the illegitimate traffic, to diminish the evil effects of alcohol, and to educate individuals and generations to greater care and a greater sense of responsibility with regard to alcohol." "An effective instrument," "correctly used." What a volume of wise instruction to America is condensed into these five words for those who have eyes to see.[1]

THE SOCIAL SERVICE WORKER AND THE EX-SERVICE MAN.[2]

By J. T. Boone, Lieutenant, Medical Corps, United States Navy.

The subject given to me to present is worthy of more expert and more specialized elucidation than I am able to furnish with my meager knowledge of the functions of the social service worker. We are interested to know just what position the social service worker should advantageously occupy in our sincere efforts to provide the very best care and the very best treatment for those unfortunate individuals who have been disabled in the service of our country or who have suffered disabilities as a result of, or traceable to, that service during the World War.

My knowledge of the social worker for the most part is limited to his or her duties associated with naval institutions. For almost three years I have represented at the national headquarters of the American Red Cross the Surgeon General of the Navy, who is the Navy Department's representative on the national executive committee. My official position has been one of liaison, but in the organization of the Red Cross I am the director of the Bureau of Naval Affairs. In that position it has been my privilege to assist in the adoption of a naval-Red Cross program for the carrying out of one of the purposes of the Red Cross congressional charter, which obligates the Red Cross to act "in matters of voluntary relief, and in accord with the military and naval authorities as a medium of com-

[1] This report is based on a private communication from Dr. Ivan Bratt and on an official Report of Labor Legislation and Social Hygiene in Sweden. July, 1921.

[2] A ten-minute paper read before a conference of all the commanding officers of hospitals treating beneficiaries of the Veterans' Bureau, held by the Federal Board of Hospitalization, Washington, D. C., Jan. 17, 1922.

munication between the people of the United States of America and their Army and Navy."

In my investigations as to the sphere of the social service worker I have found two schools of thought, or two groups of individuals, interpreting the meaning of the term "social service worker" differently. One group limits the definition to that personnel which deals with purely personal and community problems of individuals, and also to those who are trained medical social service workers, while the second group sees no limitation to the field of operation by a highly specialized worker in dealing with an individual's welfare. The first group separates the recreational, amusement, entertainment, and athletic directors from the strictly medical social service workers, while again the second group considers the amusement personnel as properly placed under the category of social service workers.

We are not particularly interested here in this academic discussion, but we should be mindful of it in giving consideration to the organization and administration of our hospitals. There is a limit to all things, so the social-service worker is limited in his or her field of activity. We seem to be living in an age of specialization. We need sanity in the practice of our professions irrespective of their nature; and what is just as essential, we need good practical common sense and not too much theory.

I believe the commanding officer of the naval hospital can be rated a skilled social-service worker, more competent to deal with the problems of his patient than any other individual, especially if he is a keen observer of human nature, if he has the interest of the patient at heart, if he searches for what we may term the soul of the man and not merely observes his flesh and blood, if he is determined to correct the mental restlessness as well as the physical agony, if he considers his patient individually and not as a case, and if he impresses on his patient that no one is as much interested in him as his commanding officer. No one in an institution should be able to take the commanding officer's place in the sympathetic understanding of the patient. Regarding the military and naval service, it has been said that the uniform stands like a closed door between officer and patient. There should be no reason for this. If it exists, the officer is responsible.

You will appreciate why I make the foregoing remarks. The commanding officer can not perform all the duties incident to the operation of a hospital and the care and treatment of a large number of patients, but while he must have various types of personnel to care for the patient, he can not delegate his responsibility for the patient's welfare to others.

In the organization of our hospitals there is a proper place for ocial service, the detailed operation of which must be left to a per-onnel which devotes its entire time to matters of a social nature and o matters touching the personal, family, and community problems f the patient. Obviously, it would be most desirable to have all lasses of personnel working in our governmental hospitals paid overnmental employees. We are working toward the millennium, ut we are far distant from it; hence, we must avail ourselves of what e find at hand. The United States is populated with a kindly, ympathetic, and generous people, which fact makes it possible for he unfortunate hospitalized veteran to enjoy the generosity of our itizenry. Much of our social programs in hospitals is made possible y the great membership of the charitable organizations of our ountry. Through these organizations the American people can and o desire to assist constituted governmental authorities to provide or the welfare of the man disabled by the war as well as the egular service man. As I have stated in the first part of my re-iarks, the Congress has legalized the assistance which the American ed Cross can render to the Army and Navy. When the veteran s hospitalized in naval institutions he is given every consideration nd treated as a naval patient. We can not and have no desire to iake any distinction between him who is serving his country to-ay and him who went to its defense yesterday. The truly patriotic ould not have it otherwise. The service man of to-day has been ctuated by just as high patriotic motives to serve his flag as the an who stood willing to sacrifice his all in the days when our eloved land was outwardly threatened by the visible enemy.

Social service should have a definite place in hospital organization. ocial service should be the agent of the commanding officer for ealing with: (*a*) The relationships of the hospital to other groups i the community; (*b*) the relation of the patients to their families id their community; and (*c*) in the relation of those matters which ffect the social conditions which are involved.

Of course, everything in the social-service department, as in any ther department of the hospital, must be under the absolute control f the commanding officer. It has a relation to the administration f the hospital and to the patient's treatment. In its relation to the ospital the social-service department may:

(*a*) Provide entertainment. (*b*) Regulate visiting under the com-anding officer's direction. (*c*) Receive proper donations previously uthorized by the commanding officer. (*d*) Stimulate in the adja-nt community resources which can be beneficial to the patients.

In the Navy the funds for our entertainment program are pri-arily provided from allotment made by the morale division of the avy Department and from ship's store or canteen profits. The

Red Cross supplements our endeavors and assigns at certain hospitals other personnel than home-service or social-service workers to assist in recreational measures.

The social-service department's relation to the patient's treatment is as follows:

(*a*) Securing social histories and other significant data for the use of tuberculosis specialists and psychiatrists.

(*b*) Securing reports on home conditions as an aid to physicians in deciding whether or not to discharge a patient to his home.

(*c*) Correspondence with home communities to adjust home situations, thereby making it possible for patients to remain in hospitals. This sometimes involves financial aid to families.

(*d*) Arranging through local communities for men who return home to have proper care and assistance in adjusting themselves to civilian life.

Then there is the after care of the patient and one the social-service department should be competent to handle.

(*a*) Helping men approved for vocational training to get in contact with the proper Government officials. When the Veterans' Bureau assigns representatives to the hospital this will be simplified.

(*b*) Following up patients who are absent from the hospital without leave or against advice to see if they return, or, if leaving against advice, that they are placed under proper supervision in the home community.

Lastly there is the information service which this department may provide:

(*a*) Communicating with family doctors and others to assist in securing affidavits necessary to substantiate Government claims.

(*b*) Information furnished to families regarding the patient's personal and family affairs when advised to do so by the commanding officer.

(*c*) Furnishing information to patients regarding Government legislation.

(*d*) Furnishing information regarding Government insurance.

The social service department of the hospital, irrespective of the source of supply of the personnel, must be considered as an integral part of the hospital, subject to the inspections, rules, and regulations of the hospital.

The Red Cross at present provides the personnel for social service, and I can not conceive how any other agency could undertake to provide this service without providing the cobweblike organization spread out over the United States, with thousands of home-service sections, as the Red Cross maintains, prepared to furnish information to the Government officials. I know of no other civilian organization which enjoys the semiofficial recognition of Congress and to

which we in the Government service can turn for assistance as we can to the American Red Cross.

The social service problem is one of helping the doctor, the man, the family, and the community.

We, as medical men, must remember that treatment, if successfully instituted, must embrace rehabilitation of the mind as well as the body. A cure can not be affected by the simple administration of drugs or a stroke of the scalpel. Something just as important, and in many instances more so, is the attention to the mental state of the patient. All the medicine, all the most skilled surgery, will not cure unless careful attention is paid to the patient's frame of mind. The whole social service effort is one to help bring back the patient to the world of reality and to maintain morale at a high level.

We must always be conscious of the fact that in caring for patients there is a basic distinction to be made due to the mental depressions resultant from illness, helplessness, and dependency, and protracted convalescence. Sick men have distorted judgment, they reason illogically, magnify trifles, and acquire a certain degree of negativeness. Their spirit of discipline is stunted. They resent correction and restriction. They must be retrained to think logically and coherently. Each patient must be treated separately. We must prescribe for his individualism when he is abed and while still unable to attempt a return to group action. The morale of the patient is just as important as the administration of drugs or surgical relief. In fact, I do not believe it too broad a statement to say more so, for every patient must be treated from a morale standpoint. While some patients need medical, others surgical treatment, a great many need neither medical nor surgical attention but only mental rehabilitation. The last class are not necessarily pathological cases nor psychiatric cases, but comprise a peculiar class demanding careful study and definite prescription, usually of a recreational form.

We must not carry social service to excess, for the good of the man himself, his family, and the community. The greatest service we can render the disabled ex-service man is to reinstall in him *self-reliance*. We must keep his morale high, for morale is the perpetual ability to come back.

REVIEW OF THE REORGANIZATION OF THE SANITARY AND PUBLIC HEALTH WORK IN THE DOMINICAN REPUBLIC UNDER THE UNITED STATES MILITARY GOVERNMENT OF SANTO DOMINGO.[1]

By Commander R. Hayden, Medical Corps, United States Navy.

The Dominican Republic is located in the West Indies, occupying the eastern two-thirds of the island of Haiti, between Cuba and

[1] Reprinted from the American Journal of Tropical Medicine. January, 1922.

Porto Rico. The country has an area of about 20,000 square miles, about five times the size of Porto Rico, or as large as the States of New Hampshire and Vermont combined. The people, about 800,000 in number, are a mixture of Spanish, Indian, and African, the Negro element predominating, and are noticeably Spanish in language, traditions, and customs. The greater portion of the people are illiterate, the smaller number of educated people comprising the professional and political classes. The capital and largest city, Santo Domingo, has a population of about 27,000.

Owing to the failure of the Dominican Government to observe its treaty obligations and the menace of unsettled conditions, both to foreigners and to the Dominican people themselves, due to revolutions, the United States Government in May, 1916, found it necessary to direct its naval authorities to occupy the country and to restore and maintain order. The present military government was established in November, 1916, with Captain (later Rear Admiral) H. S. Knapp, United States Navy, as the military governor. A cabinet of United States naval and marine officers was created in order to administer the affairs of the Dominican Government departments, but Dominicans were continued in all subordinate positions as far as practicable. The Dominican judiciary retained their functions. The proclamation of occupation states that the military occupation was undertaken with no idea of destroying the sovereignty of the Republic, but, on the contrary, was designed to give aid to the country in returning to a condition of internal order. Measures are now being taken to restore the Government to the Dominicans.

REVIEW OF SANITARY CONDITIONS AT THE TIME OF AND IMMEDIATELY FOLLOWING THE ESTABLISHMENT OF THE MILITARY GOVERNMENT.

At the time of the occupation sanitary and public-health activities in the country were found to be almost entirely lacking, except in the largest cities, and in these they were very inefficient. A sanitary law was in existence, but it was inadequate and very weakly enforced. With few exceptions, none of the administrative bodies provided for by the sanitary law were even appointed, and those appointed were not functioning. The law governing the practice of the medical professions was better administered, but this, too, was not well enforced.

Shortly after the establishment of the military government the position of chief sanitary officer was created by Executive order and filled by a naval medical officer, who was given general supervision over the administration of the public health laws but no actual personal authority. So far as possible, all the personnel required by law was appointed with the idea that the laws in question should

be administered by the Dominicans, under the general supervision and instruction of the chief sanitary officer. These conditions continued until the summer of 1918. During this time but little more than the most elementary sanitation was accomplished. That more was not done during this period was entirely due to the lack of appropriations and the inertia or even passive resistance of the Dominican authorities, both sanitary and municipal.

Inasmuch as the organization of a public-health service for the country was not included among the purposes specified for the establishment of the military government, it was decided that explicit authority from Washington was necessary before the military government could expend any large amount of money for this purpose. Accordingly, the subject was referred to Washington, and the whole matter of proceeding with the reorganization of the sanitary and public-health work in a systematic and comprehensive way was approved by Washington before it was actually commenced.

IMPROVED SANITARY CONTROL.

In August, 1918, in view of the unsatisfactory record of the preceding year and a half, the apparent impossibility of obtaining satisfactory results from the administrative bodies provided by law, and the evident necessity of having central control with an active and responsible head to the public health organization of the country, the military government decided to abandon its former policy of leaving matters of sanitation and public health practically in the hands of the Dominicans. The real reorganization of the sanitary and public health work of the Republic dates from that time. Pending the promulgation of a new law on the subject, a series of Executive orders were issued modifying existing law and giving more authority to the chief sanitary officer and naval medical officers stationed throughout the country. Better results were soon apparent, but, because of the inertia and noncooperation of the municipal authorities, the desired improvement in conditions was only very gradual. Various necessary sanitary regulations covering the most important needs of the country as a whole were promulgated, however, and efforts made to secure the interest and active support of the various municipalities.

NATIONAL SANITARY ORGANIZATION.

On January 1, 1920, a new sanitary law governing sanitation, public health, and the practice of the medical professions became effective, all previous legislation on these subjects being annulled. This law created a new and independent Government department, called the Department of Sanitation and Beneficence, and centralized the administration of public health affairs in the secretary of sanitation

and beneficence. Under the military government, this position is filled by a naval medical officer.

Briefly, the law is written in four chapters:

Chapter I deals with the creation of the department, its organization, administration and finance, formulation of a sanitary code, administration of public institutions for the care of the sick, establishment of a district organization, compulsory vaccination, legal abolition of prostitution, and control of venereal disease.

Chapter II regulates the practice of the medical professions and trades, including the manufacture, distribution, exchange, sale and dispensing of drugs and poisons. These matters are placed under the jurisdiction of the sanitary department, except the professional examinations of applicants for license to practice medicine, dentistry, or pharmacy, which examinations are conducted by the University of Santo Domingo. Provision is made for the sale by merchants, under certain restrictions, of patent medicines and certain specified common drugs.

Chapter III established a national quarantine service under control of the sanitary department, and includes the necessary provisions of law for maritime quarantine.

Chapter IV provides for the enforcement of the sanitary law and the sanitary code.

Detailed sanitary regulations are provided by the sanitary code. This code comprises the usual requirements of such legislation and has the effect and force of law. For the purposes of the sanitary code the communities of the country are divided into four general groups according to population, and the requirements of the code are graded accordingly.

PRESENT ORGANIZATION OF THE SANITARY DEPARTMENT.

The department is under the direction of the Secretary of Sanitation and Beneficence, who is a member of the cabinet. The powers of the secretary are extensive and perhaps somewhat arbitrary. They are definitely outlined by law, however, and are necessary under existing conditions. They greatly aided the rapid establishment of an efficient department, and are essential to its proper maintenance and progress.

Acting in an advisory capacity to the secretary is the National Public Health Council. This council acts upon all sanitary regulations formulated by the secretary or originating within its own membership. Such regulations, when approved and promulgated by the executive power, form the sanitary code, and have the effect and force of law. The council is composed of five Dominicans, at least two of whom must be physicians.

Within the department proper are various divisions, as follows:

1. Division of vital statistics, transmissible diseases, and quarantine.
2. Division of sanitary engineering.
3. National laboratory.
4. Division of registration and accounts.

These divisions are organized as in any modern health department and are charged with the administration of those portions of the law pertaining especially to them.

The entire personnel of the division of vital statistics is Dominican. The first national vital and morbidity statistics of the Republic were compiled for the last nine months of 1919. Because of inability to obtain proper reports from the country at large, the statistics for 1919 are rather inaccurate. Those for 1920 are much better. The quarantine service functioned well from the beginning. The average Dominican quarantine officer does not make an excellent inspector, but carries out the letter of the law explicitly and shows rapid improvement.

After much difficulty an American sanitary engineer was obtained and placed in charge of the division of sanitary engineering. The work of this division is very important and has been extremely difficult, because of the untrained local personnel and a public not only ignorant of but strenuously opposed to the majority of its requirements. The entire personnel of this division is American and Porto Rican, as no competent Dominican was available.

Standard plans were made and distributed throughout the country illustrating the department's requirements regarding latrines, septic tanks, markets, etc. In order that local plumbers might be properly educated for their work and to enable them to pass the examination for license required by law a night plumbing school was organized and carried on for the last three months of 1920. An illustration of the attitude of the people toward this work is shown by the fact that, notwithstanding a very complete advertisement of the reasons for the school and the fact that only a nominal charge to cover cost of material would be made to students, the attendance was very poor.

The national laboratory was started with an entire Dominican personnel. It later became necessary to obtain the services of an American as chief of the laboratory and of another American as chemist. Dominican subordinates were retained. Unfortunately the majority of Dominican medical students are very slow to appreciate or understand modern laboratory work. The work done was along the lines of the usual public health laboratory, but the results were very disappointing from the departmental point of view because of the lack of interest by native practitioners and medical students.

For the purposes of sanitary administration the country is divided into 11 sanitary districts. Each district is in charge of a district sanitary officer immediately responsible to the Secretary of Sanitation. Under each district sanitary officer are a varying number of communes or municipalities in charge of communal sanitary officers. These district and communal sanitary officers have direct charge of all sanitary and public health work within their jurisdiction. Municipal sanitation is subject to the general sanitary law and code, though individual "ayuntamientos," or city councils, may adopt local sanitary regulations not in conflict with the sanitary code.

The majority of the district and all communal sanitary officers are Dominicans. While these were admittedly not the best men obtainable for these positions, the idea of the military government was to organize and train a Dominican sanitary department in order that the department might function efficiently after the Government was returned to the Dominicans. To this end it was necessary to appoint absolutely untrained natives to practically all subordinate positions and train them. This was an extremely difficult proposition, as the necessary intelligence and executive ability were rare among the people who would take the positions. As a result much wasted effort and many changes were necessary before a reasonably efficient personnel was obtained. This training was a difficult problem with the personnel available and required much patience and perseverence. It was carried on through personal instruction by general inspectors and by departmental bulletins. Results were sometimes very good, but at other times sad and even ludricrous. With some few notable exceptions, the average native sanitary officer was inclined to think himself king of his community and had to be held down with a strong hand. As with the other departments of the Government, very few native subordinates could be found who would interpret the law intelligently or reasonably, and explanation in the most minute detail was frequently necessary. These difficulties were multiplied by the fact that the great majority of the people as a whole had little knowledge of or desire for modern sanitation or public health.

The average Dominican, however, is a very reasonable person, particularly when he realizes that the question at issue is really for his own well-being. The sanitary officers have markedly improved during the past two years and will continue to improve. The general public is gradually absorbing some public-health education. The great need of the sanitary department, however, remains a trained personnel.

Violations of the sanitary law may be punished either by being submitted directly to the court having jurisdiction or by administrative fines imposed by the secretary. The court procedure is almost invariably very slow, and the administrative fine is preferred

for the majority of minor violations by both the people and the department. Administrative fines have been limited to the amount imposed by law, and in no case could they exceed $100. If the accused did not pay his fine within a specified time, the case would automatically be taken to court. If convicted, the court was required by law to impose twice the sum of the administrative fine. These administrative fines speeded up justice to a marked degree and considerably enhanced the prestige of the sanitary officer.

FINANCE.

The financial situation as regards sanitation and the public health has improved remarkably during the period of occupation. It is impossible to give, either in detail or total, the appropriations for this purpose prior to the time of the military government. So far as can be ascertained, not over $30,000 was appropriated for sanitation and the public health in 1916—that is, about 3 cents per capita. Only $5,000 of this was from the central Government. In 1920 the central Government appropriated $322,000 for purposes of public health and sanitation, this amount including that for new construction. The municipal appropriations for the same purpose in that year totaled approximately $210,000. For the last six months of the year there was available $125,000 for charity hospitals. This is a total of $657,000 for 1920, or a trifle less than 80 cents per capita of population. Leaving out new construction, we still have an actual expenditure of about 64 cents per capita for 1920. During 1921, because of diminished revenue, the total appropriations have been considerably reduced. Exact figures are not at present available.

The appropriation for 1917 was practically the same as for 1916; that for 1918 was about 50 per cent more. It may, therefore, be readily seen that for the period 1917–1920, inclusive, appropriations from all sources for sanitation and public health increased some 500 per cent, the greatest part of this increase being in the last two years.

Money for sanitation and public health work in the Republic is obtained from several sources. The Government appropriation is made by the legislative power, as elsewhere. In addition, the law requires that municipalities having an annual income of less than $10,000 shall appropriate 10 per cent thereof, and those having an annual income of $10,000 or more shall appropriate 15 per cent thereof for purposes of sanitation, public health, and charity. These amounts are expended in the municipality appropriating them. The sources of the remaining funds are the lotteries.

Prior to, and for two years after the occupation, there were many small lotteries in the Republic, supposedly for purposes of charity

and civic improvements. Money was also raised by lotteries for the construction of several churches. Actually but a small amount from the incomes of the lotteries went to the charitable or other purposes indicated. A great need of the country was hospitals. Finally, convinced of the absolute necessity for the reorganization of these institutions and also convinced of the impossibility of obtaining adequate sums for their support from other sources than the lotteries, the military government, in July, 1920, abolished all the then existing lotteries, but authorized one large lottery for the entire country. The military government did not approve of the lottery as an institution and would have abolished it had it not been for the necessity of continuing the charitable institutions supported thereby by raising the necessary funds in the manner most acceptable to the people. The action taken was for the purpose of securing the adequate support of the hospitals and orphanages concerned by a proper administration and expenditure of the lottery income. As a result of this legislation 15 per cent of the lottery income, about $300,000 annually, is transferred to the sanitary department for the maintenance of charity hospitals and orphanages.

All public funds for health, sanitation, and charity are expended under the direction and supervision of the department of sanitation.

TRANSMISSIBLE AND PREVENTABLE DISEASES.

There are no statistics available from which an even fairly accurate comparison between former and present conditions can be made. The universal and voluntary testimony of many persons well acquainted with previous conditions testifies to the greatly improved sanitation and public health of the country. Both doctors and laity voluntarily testify that cases of disease have greatly decreased, particularly contagious diseases. Infantile mortality rates are universally stated to have been lowered through a diminished amount of intestinal diseases among children. Comment has been made upon the fact that there appeared to be more children about the streets than in former years.

The first national vital statistics were compiled by the sanitary department for the last nine months of 1919. These figures were admittedly inaccurate, owing to the absence of an adequate registration law. Unreliable statistics are largely due to failure to register births and to inaccurate statements as to the causes of death. During 1919 11.3 per cent of reported deaths were given as "cause unknown."

The statistics collected in 1919 show the gross unstandardized death rate to have been 14.26 per thousand, and in 1920 11.67 per thousand. The infantile mortality rate for 1920 was 66. The figures for 1919 are so inaccurate that they can not be considered for this purpose.

The figures for 1920 are more accurate. The first national census has just been completed. This, with the experience of the past two years, should result in fairly accurate statistics in the future.

This infantile mortality rate is low, and particularly so when the almost criminal ignorance of so many of the midwives and mothers in the Dominican Republic is considered. It will be seen from these figures that there is practically no chance for the sanitary department to make any startling showing in the reduction of the death rate. The reduction of the infantile mortality and reduction of the incidence of disease, with its accompanying economic loss, must be the main points of attack. Control of infantile mortality is being brought about by the compulsory use of antiseptic umbilical dressings supplied by the sanitary department free, or at a minimum cost, by schools for midwives and the licensing of midwives, and by regulations governing the production and sale of milk. The death rates are low but can not be compared with those of previous years, as figures are not available, except in a few scattered localities.

The chief preventable diseases, in what is believed to be the order of relative importance, are as follows: First, venereal disease; second, malaria; third, uncinariasis; fourth, tuberculosis, and, fifth, yaws.

Venereal disease is given first place, because of its general and high incidence in an active state and the great number of people suffering from its after effects, either congenital or acquired. Estimates by supposedly competent observers place the incidence of syphilis at about 70 per cent of the population. Surveys made at prisons have shown about 50 per cent of syphilitics among the inmates. Throughout the country are numbers of mentally deficient persons whose condition is almost certainly due to syphilis.

After protracted consideration of the matter, including a trial of the so-called restricted districts and legalized prostitution, it was decided to make the practice of prostitution illegal, and in 1920 the sanitary department inaugurated a vigorous antivenereal campaign along the lines of similar work in the United States. At first, because of a lack of understanding of the new law and of the requirements of the health department, there was a widespread protest from the people generally and from many municipal authorities. There was a general fear of a return to the old wide-open towns which had existed prior to the occupation. After the new legislation had been in effect for a year, considerable difference in results were found in different localities. In those areas where there was active and intelligent cooperation between the health and police authorities, open prostitution was practically eradicated and venereal disease greatly diminished. Where the police authorities did not so cooperate, there was an increase in clandestine prostitution and

venereal disease. The people have generally accepted and are now believed to favor the new legislation. Results to date show that there are no real grounds for the contention that such legislation is impracticable with tropical or Latin races. As elsewhere, the results depend entirely upon the authorities in charge of the administration of the law. The effacement of prostitution was neither expected nor obtained. The same difficulties encountered elsewhere were encountered here, but intensified because of poor police and lack of adequate hospital and dispensary facilities. With the development of the hospitalization and dispensary system proposed by the sanitary department and fairly adequate police cooperation, the antivenereal campaign should prove successful in Santo Domingo. The real antivenereal problem in that country is whether this work will be effectively continued under a native administration. At present this seems rather doubtful.

Malaria is endemic in many parts of the country, but enforcement of antimosquito measures has diminished the incidence of this disease to a considerable extent. Reported cases for 1920 were about 40 per cent less than for 1919. There are no extensive swampy districts nor bad malaria regions in Santo Domingo. Because the majority of the towns are rural communities and the country population very scattered, the control of malaria there is largely a question of controlling the house water supply. This is very difficult in a country where the great majority of houses obtain their water supply from cisterns, tanks, barrels, etc., where the sanitary personnel is inadequate, and where the people generally fail to appreciate the necessity of mosquito-control work. Fortunately, but few Anopheles mosquitos are found in the cities.

Hookworm disease is very generally distributed through the country. Upon invitation of the military government, the Rockefeller International Health Board made a hookworm survey of the Dominican Republic in the summer of 1920. The result of this survey gave an estimated infestation of 52 per cent of the population as a whole. Some parts of the country are much more heavily infested than others. The north central part shows an infestation of 70 per cent, while the arid western portion had only 12 per cent.

A very interesting result of this survey was that the hæmoglobin tests of some 600 cases gave an average hæmoglobin index of 77. The average index in the heavily infested north central region was 68. This fully bears out the observation made by Dr. Stitt that the clinical effects of hookworm infection are much less in the black race than in the white. A great majority of Dominicans have a high percentage of Negro blood. Compared with other countries having a corresponding hookworm infestation, hookworm patients in the Dominican Republic show very few clinical effects. This is particu-

larly noticeable when the Dominicans are compared with their neighbors, the Porto Ricans.

Notwithstanding the absence of clinical effects, the incidence of hookworm in the Republic is sufficient to constitute a serious problem and is undoubtedly a considerable economic burden. The sanitary department is endeavoring to control this disease by prevention of soil pollution and, so far as is practicable with the available funds, by dispensary treatment of patients.

Tuberculosis is an ever-present problem here, as elsewhere. The average native of the Tropics has but little resistance to this disease, and his living conditions are against him. As yet it has been impracticable to do any real antituberculosis work in Santo Domingo. Provision for hygienic house construction and improved living conditions is made in the sanitary code. The existent hospitals, dispensaries, and municipal physicians render what help they can. A tuberculosis sanitarium was contemplated by the sanitary department, but the idea had to be abandoned for lack of funds.

Yaws exists to a considerable extent in the Republic and causes great economic loss. On the suggestion of Dr. John M. Swan and at the request of the military government, the Harvard University School of Tropical Medicine sent an expedition headed by Dr. R. W. Sellards to Santo Domingo in June, 1920, for the purpose of investigating and treating yaws. This expedition established two small field hospitals and conducted an extensive campaign of investigation and treatment of the disease. In addition, the sanitary department provided free treatment for yaws in several of its dispensaries. The people showed great interest in and appreciation of this work, many yaws patients riding horseback 10, 20, and even 30 miles to obtain treatment. Altogether 2,500 cases of yaws were treated during the last six months of 1920.

As is well known, yaws is a disease which lends itself readily to dispensary treatment. Cases were treated by both the intravenous and intramuscular administration of neosalvarsan. With the personnel available, the sanitary department found intramuscular injections to be more satisfactory. The average native practitioner available for this work could not be depended upon to give either a satisfactory or safe intravenous injection. All cases received from one to three injections, depending upon the severity of the disease. All cases were cured, and none suffered from abscess formation. Everything considered, this was an excellent record, and one that can only be really appreciated by those acquainted with the difficulties under which the work was performed. During the early summer of 1921 the yaws cases treated by the Harvard expedition and the sanitary department during 1920 were checked up to discover possible recur-

rences. So far as could be discovered, there have been no recurrences or new infections amongst these patients six to eight months after stopping treatment and living where many were exposed to yaws. In addition, four volunteers from the cured yaws patients were inoculated with scrapings from an active yaws lesion. They were carefully watched for four months, but none developed yaws. A volunteer control case with a negative history of yaws was inoculated with the same scrapings and developed characteristic yaws by the end of three weeks. Of course, it is difficult to draw conclusions from such a small series of cases, but it appears that there is an apparent immunity produced by yaws, even after cure by neosalvarsan, or that the affection remains without any apparent clinical manifestation, and the patient is, therefore, not susceptible to reinoculation. An interesting coincidence of the treatment of yaws by the sanitary department was the comparatively large number of cases of apparent gangosa who came for treatment. The clinical manifestations were indentical with the textbook illustrations of this disease. The frequency with which these cases gave a history of yaws was very suggestive of a relationship between the two. These cases of apparent gangosa were found to respond rapidly to treatment with neosalvarsan. This would appear to indicate that gangosa is only tertiary yaws. The relationship between these two diseases is now being further investigated by Drs. Hager and Houghton of the Navy, now working with the sanitary department.

HOSPITALS.

The hospital situation of the Republic was considerably improved during the past year. Prior to that time there were only seven charity hospitals in the country, five of these being most inadequately supported by local lotteries and subscriptions.

The Government considerably increased the facilities of the old Dominican Military Hospital in Santo Domingo City and established a training school for native nurses there. The American Red Cross rendered material and greatly appreciated assistance in this work as well as in connection with the Seibo Hospital, established by the Dominican Chapter of the American Red Cross. The Government has practically completed a leper colony about 15 miles from Santo Domingo City. Plans were also made to construct a new and very much needed Government insane asylum, but, because of lack of funds, it was never started.

In addition, after the reorganization of the lotteries previously mentioned, all charity hospitals and orphanages supported by these funds were placed under the general supervision of the department of sanitation, and were required to obey its regulations for their proper administration. The amounts available for each institution

were considerably increased by the reorganization of the lottery and were allotted in accordance with the needs of the institution in question, upon recommendation of the secretary of sanitation. The juntas or boards previously administering the institutions continued this work if they so desired, but they were required to administer them in accordance with the department's regulations. If these regulations were not complied with, no allotment of funds was paid the institution in question.

Under this plan the charity hospital capacity of the Republic was more than quadrupled in a year. The working bed capacity of these hospitals was increased from approximately 100 for the entire country to about 450. This number, of course, could be greatly increased in case of emergency. In addition much new and modern hospital equipment was provided. The orphanages were improved to a certain extent, but not as much as the hospitals. American doctors and nurses were provided for two of these hospitals for the purpose of introducing more modern methods and training the local personnel. These improvements were brought about with practically the same funds as those that had been previously theoretically available for this purpose.

In addition to the above-mentioned completed improvements the department planned the completed hospitalization of the country so far as charity hospitals were concerned, as well as a system of dispensaries. This additional plan has had to be at least temporarily abandoned for lack of funds.

PRACTICE OF MEDICINE.

The practice of medicine, and for that matter dentistry and pharmacy, in the Republic has been and is still in a rather chaotic state. There is approximately only one doctor for every 8,700 of the population. Outside of the forces of occupation there are very few foreigners practicing medicine in the country. The majority of practitioners are graduates of the University of Santo Domingo. Some few of these have taken postgraduate courses abroad. The majority of such courses, however, lasted only a few months each. The standards of the medical profession, therefore, are those of any backward country. Until recently the practice of the various forms of witchcraft flourished in the country districts and also existed among the poorer classes in the cities.

The University of Santo Domingo examines the professional qualifications of foreign graduates desiring to practice in the Republic. Its own graduates are licensed to practice upon graduation and take no examination corresponding to that of our State boards. The medical course at the university is five years, but most inadequate. All teaching is didactic. There is no dissection and no lab-

oratory work worthy of the name. Practically all clinical instruction is obtained from private practitioners in their offices and is entirely dependent upon the initiative of the student. For the past two years attempts have been made by the sanitary department to provide regular hospital clinical instruction for senior students, but the university faculty would not make this compulsory and attendance was at a minimum. As a matter of interest and to give a comparison with our own medical schools, one instance is quoted where a graduate of this university, after considerable coaching, was admitted to the second or sophomore class in a class A medical school in the United States. Except to contribute to local pride, the university does more harm than real good as a medical school. So long as it continues as at present the country can hope for little improvement in the general grade of its medical practitioners. As may be readily imagined, the average graduate of the university is comparatively ignorant and may even be considered rather dangerous to his patients, as he thinks that he has a first-class medical education and acts accordingly. These remarks apply also to the dental and pharmaceutical schools. Under present conditions in the Republic there is little if any hope for the ultimate betterment of the university. Were it entirely discontinued, the would-be medical practitioner would be forced to go abroad for his professional education, to the greater good of himself, his prospective patients, and his country.

The few graduates of the university prefer the larger cities and towns and it is almost impossible to get them into the country. As a result it was found necessary to "authorize" a limited number of nongraduates to practice medicine, dentistry, or pharmacy, as the case might be, in places where there were no graduates. This is an admittedly poor system, but slight medical care is perhaps better than none, in spite of the old saying that "a little learning is a dangerous thing."

THE FUTURE OF SANITATION AND PUBLIC HEALTH WORK IN THE DOMINICAN REPUBLIC.

Real sanitation and public health work in the Dominican Republic is largely in the future. There has been no past worthy of mention, and only a good start has been made for the present.

The sanitary department has been organized, has adequate legislation under which to act, and during the last two years has made considerable progress. From a condition of practically no sanitary organization, a well-functioning organization has been built up, one that is daily securing results. While much is still to be desired, the present sanitary organization has been stated by competent observers to be securing general results equal to those of the much older sanitary departments of Porto Rico and Cuba.

The great need of the department is a trained personnel. This can not be too strongly emphasized. The existing laws are enforceable, but because of the lack of a trained personnel and the ignorance of the majority of the population are not yet being efficiently enforced. It must be remembered that the organization is but 3 years old, and the results obtained to date are all that could be reasonably expected. The future effectiveness of the department depends upon overcoming this lack of a trained personnel. Because of lack of funds and difficulty of travel, it has been impracticable to conduct a school of sanitary inspectors. At present training is being accomplished through an elementary textbook for inspectors, published by the department; frequent departmental bulletins; and frequent inspections and instruction by an American inspector. These methods are gradually securing results, and the work of the local inspectors has been much better during the past year than before. Strangers arriving in Santo Domingo are apt to think that little real sanitation has been accomplished; but they are ignorant of previous conditions. As yet, the department has had but little time to attempt any real public health education. Its own personnel had to be educated first. Such public health education as has been attempted has been almost entirely by means of pictures, posters, and personal instruction by sanitary officers. This is necessary on account of the very high percentage of illiteracy in the country. The public schools give elementary instruction in sanitation and hygiene along lines similar to those followed in the public schools in the United States. This will help eventually.

Because of the short time in which any attempt at real health work has been in progress, and because of the almost universal public illiteracy and ignorance, but little real appreciation of this work is yet shown by the public. The average Dominican, however, seems to be receptive to public-health teaching, and good results can be obtained as soon as they understand the object in view. In my opinion, and speaking for the good of the Dominicans themselves as well as for the future of the sanitary department, the time has not yet arrived, and will not arrive for some time to come, when this work can be safely turned over entirely to the Dominicans. Outside assistance will be essential for some years if the good beginning already made in the sanitation of this country is to continue and real results finally obtained.

If the existing sanitary laws of the Republic are not continuously and vigorously enforced, and if the present young but promising sanitary department is not properly supervised and supported, the work of the past few years in this respect will have been wasted. If the present work is continued and at all adequately supported the results obtained should be excellent and lasting.

SOME LESSONS OF THE WORLD WAR IN MEDICINE AND SURGERY FROM THE GERMAN VIEWPOINT.[1] [2]

By W. S. Bainbridge, Commander, Medical Corps, United States Navy Reserve Force.

The shadows of war are lightened to some extent by the advance in medicine and surgery, which constitutes a by-product of modern warfare. Owing to the enormous scale on which the World War was waged, the changes incident to the upheaval of embattled Europe are proportionately great and far-reaching. The bitter lessons taught by the hardships of war have helped to mature the fruit of conquest over wound infections, war diseases, and epidemics. Enormous tasks were set the medical profession by the exigencies of an unprecedented world war. These tasks were in part entirely new and had to be done under almost unbelievable difficulties and obstacles, on the battlefield heaped with wounded men, often in the more or less inadequate and imperfectly equipped field hospitals, in the laborious repair of mutilation and disablement. Medicine and surgery have been enriched through a wealth of otherwise unobtainable practical experience, for the new conditions provided unexpected observations, and untrodden paths of research were opened up. All great wars have made great changes, and the world is never the same again after the fighting has come to an end. A change for the better is reflected in medical and surgical knowledge under the stimulus of war necessity.

The lessons of the World War on the side of the Allies are discussed in my "Report on medical and surgical developments of the war" (special number, Naval Medical Bulletin, January, 1919), and the present purpose is to review the work done by the Germans during the four years of world-wide clinic. The experience of observers of all nations engaged in the stupendous conflict must be collected and compared, and the evidence weighed before final conclusions can be formulated. German war experience was practically a sealed book during the time of strife, but since the armistice it is gradually becoming accessible for comparison with the experience of the allied medical and surgical services. It remains for the future to pass judgment on the merits of the medical profession on both sides, where all concerned undoubtedly endeavored to do their best in the healing of their smitten.

In the autumn of 1915, at a time when the German medical and surgical machine was working as smoothly and efficiently as was their military machine, I was enabled, as a neutral, to observe the medico-surgical activities of the Central Powers, and some of these conditions

[1] The title clearly indicates the aim of the author. It is the German estimate, not ours.
[2] Reprinted from The Military Surgeon for October, 1921.

will be portrayed in the following pages. Later on, after the entry of the United States into the war, information was obtained from neutral sources, including Swiss and Dutch periodicals, from wounded men, war prisoners, and refugees. Since the armistice German medical literature itself has provided data as to the German estimate of their own advances in medicine and surgery through the World War.

Years will have to pass before the tide of international resentment will have ebbed sufficiently to permit the securing of unbiased judgment even among scientific men. The fact must also be taken into consideration that many observers have seen only one portion of the front, or only a single phase of medicine or surgery, while in the interest of the whole, minor individual experiences must all be welded together before final conclusions are justified. It is of the utmost importance, in behalf of suffering humanity, that the forward steps in the evolution of medicine and surgery be definitely established, for measures which have been found of value during the conduct of the war will prove equally beneficial as the same principles are involved, also, in large measure, during the reign of peace.

If the literary output of German authors conveys the impression that the progress of German medicine and surgery is not as striking as the headway made on the allied side, due weight must be accorded to the comparative psychologic factors and racial characteristics, which here enter essentially into consideration. The Teuton is by nature a patient plodder and toiler, capable of infinite effort and attention to the smallest detail in the endeavor to achieve perfection along given lines of inquiry. In looking for ways and means to scale an apparently insuperable wall, he will begin with an investigation of the soil on which it has been erected, its geological strata, its minerals—not forgetting its bacterial flora!—whereas the intrepid Latin will scale the wall and the dauntless Anglo-Saxon will clear it at a bound. The Teuton worker travels slowly, but he does not rest until he has reached his goal, and none know better than he how to profit by the discoveries or experience of others. From the point attained by the allied medical and surgical services, the Germans may go on and yet abundantly do their share toward the perfection of the healing art. After the passing of a decade of international rest and untrammeled exchange of scientific thought, and not until then, will it be possible to collect the pearls brought up by the members of the medical profession of all nationalities from the great sea of human suffering in the war that shook the world. The outcome of the war in the defeat of the German military machine has naturally undermined German ambition and endeavor, and it is a question if the medicine and surgery of the future will be indebted to Germany for many of the fruits of triumph over wounds and disease which always spring from the

bloody seeds sown on battle fields. Contributors to German medical and surgical literature claim that they can look back with justified pride on their achievements in the World War and that the part played by them in the progress of scientific as well as practical medicine and surgery must not be underestimated. Undoubtedly, without German X rays and with Behring's antitetanus toxin, the Allies would have suffered still greater losses than they actually incurred. Aside from what they call the American-Dakin solution, which, early in the war, was systematically tried and then discarded in their hospitals, German writers state that they have not heard of any discoveries incident to war experience on the side of the Allies. Several authors, writing independently, assert that nearly 90 per cent of their disabled and wounded were refitted for military service in the field and base hospitals, or rendered self-supporting after the conclusion of hostilities. It is officially stated that of two and one-half millions wounded, 83.3 per cent were again rendered fit for active duty in the sanitary formations of the field and occupation armies. Of the sick and wounded who reached the home hospitals in Germany, only 1.5 per cent died. Particular attention was given in their orthopedic hospitals to restoring usefulness by providing proper support for indolent useless portions of the body; to the molding of stumps and the aftertreatment of stumps in amputations; to the fabrication of prosthetic appliances for amputated limbs; to the mobilization of stiffened joints; to the improvement of locomotor and supporting apparatus in general. Reparative and reconstructive surgery has always been an important domain of German surgery and has taken a long stride in advance under the exigencies of war mutilations. Many excellent technical inventions were made, permitting a gainful occupation and tolerable existence of many unfortunate war cripples.

The cost of the war to Germany in human material is shown more eloquently than words can express it, by the following statistical figures from authentic sources:

TOTAL LOSSES OF THE GERMAN ARMY FROM BEGINNING TO END OF WAR, ACCORDING TO OFFICIAL LISTS PUBLISHED UP TO THE LAST OF MAY, 1919.

(Schwiening, Sanitäts-statistische Betrachtungen, 1920.)

(*a*) Killed in battle	1,531,048
(*b*) Missing	991,340
(*c*) Wounded	4,211,469
(*d*) Died of disease	155,013
Altogether	6,888,870
Including total deaths	1,686,061

Deaths from disease amounted to only one-tenth of deaths from wounds.

(*a*) *Killed* means those who died in battle, or later on, from wounds inflicted by the enemy.

(*b*) *Missing* refers to war prisoners and soldiers whose fate remained unknown.

(*c*) *Wounded* means soldiers whose life could be saved.

(*d*) Deaths from disease, accidents (aside from deaths in battle) and suicide in the field or reserve armies.

The total number of dead, including the missing and those likely to die from their wounds, was officially estimated as 1,800,000, nearly 2,000,000 for the four war years. The loss of the German population is estimated at 26.5 pro mille of the original number of inhabitants (approximately 68 millions at the beginning of the war). The annual average of deaths of males, in the age group from 18 to 45 years, was 5.5 times greater during the four war years than in times of peace. This group naturally represents the strongest and most productive portion of the German people; more than one-tenth of this number was cut off during the war. In other words, there were 340,000 more deaths per year than correspond to the regular annual average of deaths during military age.

The monthly average of the missing increased during the last year of the war, as a natural consequence of the military events on the western amphitheater of war during the summer and autumn of 1918.

The appalling number of war injuries is illustrated by the fact that, during the Galician campaign in 1915, no less than 165,000 wounded were transported by rail in barely four months (including about 30,000 war prisoners), a daily average of 1,400 wounded. During the German offensive in the west in 1918, 80,000 wounded of the Seventeenth Army required transportation, the daily average being 8,000 men. On one day the transportation service was burdened with 12,000 wounded.

As a member of the seafaring branch of the service, I was especially interested in transportation by water routes, which were utilized for relatively short distances when the Germans crossed the Danube in 1915. Steamers with tugboats equipped as hospital ships went from Kerverwara and Barias to the collecting stations on the right shore, Semendria, Dubrarica, and Gradiste, a distance of from 25 to 40 miles, to fetch the wounded. The connection between Semendria and Barias was maintained until the railroad bridge near Belgrade was completed so that the hospital trains could cross the Danube. Transportation by the water route, although a boon to the wounded, has the

disadvantage of slowness, and was therefore not found desirable for long distances. At the western front canal boats were used only occasionally for short distances and for small relays of wounded.

Readers interested in the sanitary condition of the German Navy during the World War are referred to the end of this article for the corresponding statistical data.

Austrian medico-surgical activities are reflected in the reports of the large war hospital of the Geldinstitute in Budapest, which was opened in November, 1914. Both in regard to size and equipment this hospital provided the best of care for the sick and wounded. It is interesting to note that the first and second winter of the war brought many cases of disease of the respiratory apparatus and of the joints. The first winter months were especially characterized by the large number of frostbitten extremities sustained in the Carpathian engagements, whereas during the second winter, when adequate provision against cold and exposure had been made, the respiratory and articular affections predominated. In the Budapest hospital war wounds were represented by 43 5 per cent and internal diseases by 56.5 per cent of the cases. The majority of the wounded came from the Russian amphitheater of war, owing to its relative vicinity to the hospital. The greatest contingent of all wounds was formed by peripheral injuries (73 per cent); injuries of the trunk were represented by 15 per cent, and injuries of the head by 8 per cent of the cases. About 16 to 17 per cent of the gunshot injuries were complicated by fractures.

It appears that many pitiful cases of frozen extremities occurred during the first winter, 1914–15, nearly 1,000 cases of frostbitten toes and fingers, hands or feet, coming under treatment during this period in the Budapest War Hospital.

In the spring of 1915 a military hospital in a suburb of Prague received for treatment 282 cases of frostbite of the first and second degree (including 260 cases of frozen feet, 4 cases of frozen hands, and 18 frostbites of other parts of the body); also 101 cases of frostbite of the third degree (93 of the feet; 2 of the hands, and 6 others). The winter of 1915–16 brought 95 frostbites of the first and second degree (including 77 cases of frostbite of the feet, 3 of the hands, and 15 others) and 33 frostbites of the third degree (including 31 frostbites of the feet, 1 of the hands, and 1 case of frostbitten ears). Cases of the first degree were most efficiently treated with lukewarm baths and by painting the parts with iodine tincture. In frostbites of the second degree the application of iodine tincture was supplemented by emptying the vesicles and dressing the superficial skin ulcers with boric acid ointment. Frostbites of the third degree were

reated without operation when possible, and as a rule only a few oes were lost, but in one instance the foot had to be removed as far s the talus and in another low amputation of both legs was unvoidable.

PROGRESS OF GERMAN SURGERY.

Noteworthy facts in the progress of German surgery incident to he World War are discussed in the following under five headings, vhich show at a glance what the war taught Germany about wound reatment:

I. Improved control of wound tetanus.

II. Introduction of deep antisepsis.

III. Institution of a uniform successful treatment of gunshot ractures.

IV. Adoption of active surgical measures in gunshot wounds of *a*) the skull and (*b*) the abdomen.

V. Improved vascular surgery.

I. IMPROVED CONTROL OF WOUND TETANUS.

An appalling number of wounded with tetanus infection arrived n the German war hospitals at the western front as soon as the conaminated soil of the Champagne had been plowed up by the thickly alling artillery projectiles. The statistical figures of Madelung how a mortality of about 70 per cent among 174 cases of tetanus vhich came under his observation during the first three months of he war. On the basis of a larger material, of 351 cases, Kümmel eported at the first surgical meeting held in Brussels in April, 1915, nat 242 died and 109 recovered, making a mortality at the front of 0 per cent. The tetanus incidence steadily increased during the rst winter, and according to Behring actually reached 4 to 5 per ent in certain sectors of the front. On the eastern amphitheater f war, especially on the sand plains of Poland, the number of etanus infections, while still large, was not nearly so high as in 'landers.

Prophylactic injections of Behring's tetanus antitoxin were soon dministered as a routine procedure in all wounds, by order of the 'eldsanitätschef, Otto von Schjerning, with the result that wound etanus was brought well under control. The large available supplies of the serum in German laboratories and factories were romptly commandeered by the army administration for these prohylactic inoculations, to such an extent that there was not enough erum left on the market for the treatment of patients who arrived vith tetanus in certain war hospitals, notably at the eastern front. n active cases the intraspinal administration of magnesium sulphate

was followed by beneficial results. In base hospitals, situated at a distance from the front, the effects of curative serum inoculation were found to be greatly superior to results obtained in peace practice. This is probably explained by the timely employment of the serum in large doses and in a more appropriate way (intravenous or intraspinal administration).

One of the lessons learned by Germany in the war concerns an advance in the early recognition of the incipient symptoms of tetanus. The first step in advance was the discovery of local tetanus as the earliest sign of the disease. Observers learned to interpret the primary manifestations of general poisoning in this infection as an increased irritability of the central nervous system, with the resulting disturbances of the delicate and complicated reflex movements.

Gas gangrene.—This dreaded wound infection was combated by the Germans by free incision and drainage, antiseptic agents, Bier's hyperæmia, and toward the end of the war by means of a polyvalent antibacterial and antitoxic immunity serum, directed primarily against bacterial growth, but also against the effect of bacterial toxins. This serum was administered as a prophylactic measure and also as a curative agent, in the form of early repeated injections. It is claimed that experience during the last part of the war showed that the employment of this serum, especially as a prophylactic agent, was attended by highly beneficial effects. The chapter on "Gas-bacillus infection" in the "Report on the Medico-Military Aspects of the European War," 1915, by Surgeon A. M. Fauntleroy, United States Navy, will be found of value and interest in this connection.

II. DEEP ANTISEPSIS.

This salient achievement of German war experience, introduced by R. Klapp, is based on early wound excision in combination with the strongly disinfecting action of the higher homologues of the hydroquinine series, which in contradistinction to other antiseptic agents cause no serious tissue damage. As a very powerful disinfectant, readily tolerated by the tissues, the Germans used a preparation (isoctyl hydrocuprein) named Vuzin, after Vouziers, a small town in northern France. The method of deep antisepsis is carried out by uniformly injecting all tissues, after the wound has been excised, with a solution of Vuzin, 1:5000. For days afterwards the solution leaves the wound through a retrograde lymph flow, and the emigration of leucocytes is diminished, but the curative effect of deep antisepsis is essentially credited to the strong disinfecting power of the remedy.

Wound infections increased enormously in the first months of the ar, as a result of the conditions of trench warfare. For the better ontrol of these infections, conservative measures were soon aban- oned, under the leadership of Garré, Ritter, and Kroh, in favor of ound purification, with very good results. The wounds were rad- ally handled and extensively excised as soon after their infliction s possible. Early excision promptly became the routine procedure t the entire front. The results in many cases were still further im- roved by primary wound suture, which often shortened the healing rocess by weeks or months. Besides excision and drainage, antisep- c agents were employed, especially in the form of wound irrigation ith carbolic acid solution (3–5 per cent). The Germans heard of he benefits of hypochlorite solutions and adopted the Carrel-Dakin reatment to some extent, but found this too complicated and not ecessary after radical wound excision had been adopted as a routine rocedure.

German war surgeons soon realized that *infection* was the pre- ominant feature in the injuries of the World War, and that the per- ntage of severe infections with life-endangering complications was ery high. The early hopes of some German war surgeons to the ffect that their splendidly organized sanitary service would provide uch favorable conditions of transportation and treatment as to re- uce infection to a minimum were blighted by the experiences of the rst great battles, which within a few days brought an enormous umber of wounded, so as to overwhelm even the most efficient sani- ary services. During my visit in Germany as a neutral, in 1915, I arned that many wounded were not found until they had been ex- osed for days on the battle field without attention of any kind. thers who could be transported relatively soon to the main dressing ations, or farther back to the field hospitals, arrived in such numbers at much time elapsed until the wounds could be properly treated. ne of the chief causes of the high percentage of infected cases must herefore be sought in the relative failure of first aid and transporta- on facilities, owing to the unprecedented numbers of the wounded. he conditions of trench warfare played an important part in this spect, and climatic factors were also cooperative, the wounds being uch more liable to infection in warm than in cold weather. It is ardly necessary to mention that the large numbers of artillery pro- ctiles used in this war was essentially responsible for the high per- ntage of wound infection.

The increase of artillery wounds in the World War caused German ar surgeons to abandon the old rule of Von Bergmann, to regard all unshot wounds as sterile. Conservative wound treatment was soon placed by active operative measures, and mild antiseptic agents came

into favor instead of pure asepsis. For example, Garré employed as irrigating fluids with a large mechanical action very dilute watery solutions of iodine; hydrogen peroxide (3 per cent); mercuric bichloride (1:5000); or Dakin's hypochlorite solution. Rest and fixation of the wounded part were extensively used as the most important adjuvant of wound repair.

For the *prevention* and *control* of *infection*, German war surgeons found nothing to equal a careful purification of the wound and its environment, with complete fixation of the limb in plaster dressings. As a prophylactic measure, the wounds were incised, drained, and the wound surfaces excised, unless there was reason to fear that excision would materially impair the function of the part.

Primary suture, after excision of war wounds, is a noteworthy advance in German war surgery. The wounds were at first treated with dry dressings, later by open treatment, then by half-open, so-called physical wound treatment with hypochlorite solution. Badly lacerated and contaminated wounds were excised in healthy tissue, "like malignant tumors," with very good results. In a field hospital under Fründ's direction, 184 or 280 wounds were closed by primary suture, after excision and irrigation with hypochlorite solution. Upon the basis of experience with 207 cases, Hufschmid and Eckert were enabled to state that even very extensive shrapnel wounds of soft parts could be made to heal primarily through excision and suture, even when the injury dated back over 24 hours. Suppuration and general sepsis were reduced almost to a minimum after extensive wound incision and primary suture. The method was found to result in favorable repair, with smooth linear cicatrices and a greatly shortened period of convalescence. A much smaller number of infected cases left the field hospital where immediate purification of the wound was the rule than came from those stations where conservative measures were in favor. Gas gangrene and other grave infections were especially rare after primarily radical treatment of gunshot wounds of soft parts. The length of time after which wound excision and primary suture still had a curative effect in Hufschmid and Eckert's experience in a field hospital is very noteworthy. Early in the war it was assumed in Germany, as well as in the allied medical services, that this mode of treatment presupposes the arrival of the wounded in the hospital within the first 6 hours or so after the infliction of the injury. It was also assumed that large artillery wounds with extensive destruction of muscle and bone were not amenable to excision and primary suture. Encouraged by their good results in cases of badly contaminated injuries of the soft parts of the head, dating back over 12 hours, the above-named operators gradually came to perform excision and primary suture in many cases of large artillery wounds of all parts of

the body, with extensive destruction of tissues. The fact is especially emphasized in their report that the good results of this method were obtained also when the injury dated back 24, 48, or more hours. Readers familiar with the principles of primary wound treatment on the allied side will be interested in comparing this statement with comments on the relative period of contamination as distintinguished from dissemination and infection, given in my "Report on medical and surgical developments of the war," Special Number, United States Naval Medical Bulletin, Washington, January, 1919.

III. GUNSHOT FRACTURES.

The institution of a uniform treatment of gunshot fractures was soon found to be an urgent necessity on the German as well as on the allied side. The remarkable frequency of gunshot injuries of the extremities is emphasized in all recent war statistics. By a German authority (Goldammer) their number is estimated as five-sixths of all war injuries. The number of gunshot fractures is proportionately high, their astounding frequency being explained by the destructive action of modern projectiles, and especially by the enormous increase of artillery wounds, as compared to former wars. Figures are now available concerning the first half of the war, and we find, for example, that in the Budapest War Hospital, service of W. Milko, altogether 4,530 war wounds came under treatment during the period from October 15, 1915, to May 1, 1916, including 3,336 gunshot wounds of the extremities. The latter again included 884 gunshot fractures, or 26.5 per cent of all peripheral injuries. The great majority of these fractures concerned the upper extremity (728 of 884 cases); only 66 patients had fractures of the thigh, and 90 had fractures of the leg. On examination of this material in regard to the various types of fracture, the majority were found to be splintered fractures in two-thirds of the cases. Simple transverse and oblique fractures were seen in 20 per cent of the total material. Fractures with extensive shattering of bone or large bony defects were relatively common, whereas perforating gunshot wounds of bones were rather exceptional. As regards the frequency of infection, 331 of the 884 gunshot fractures in the Budapest Hospital healed practically by first intention; in 487 considerable suppuration occurred, and symptoms of grave general infection were present in 66 cases. It must be added that the small caliber injuries greatly predominated in this material, whereas shell and shrapnel wounds were very rare, the reason being that this hospital received 80 per cent of all gunshot fractures from the northern amphitheater of war, where the artillery engagement was not nearly as active as at the western front.

The Germans soon learned that radical procedures were urgently indicated in all cases which reached the dressing station or the field hospital with symptoms of grave infection, especially in all cases of gas phlegmon. According to their experience, life could usually be saved only through immediate amputation in subfascial infections, whereas in epifascial infections the process could often be arrested by the timely performance of multiple incision. *Prophylactic tetanus-antitoxin* injections were given with excellent results in the dressing stations to all soldiers who arrived with badly infected fractures. The second measure of the Germans against wound infection consisted in *immobilization* of the gunshot fracture. The object was to aid in the limitation of the spreading of infection. The mode of fixation of the fracture naturally varied according to the site and degree of the bony lesion. The greatest difficulty was naturally encountered in the proper treatment of fractures of the thigh, the consensus of opinion being to the effect that circular fenestrated plaster apparatus constitutes the best transportation bandage for femoral fractures. The Germans constructed many ingenious extension splints, but it was found that even the very best of these could not compete in their judgment with good plaster apparatus in the securing of absolute immobilization of fractured limbs.

Extension combined with semiflexion was found to be the most appropriate mode of treatment for fractures of the thigh. No matter what treatment was used, however, these cases with few exceptions all healed with shortening, which increased in proportion to the bony defect caused by the wound and to the time interval between the injury and the extension. Other causes of shortening were early, overradical operative interventions, with extensive removal of the fracture ends. More or less limitation of motion in the knee joint was found to be inevitable in fractures of the thigh treated in plaster apparatus. Consolidation of the fracture occurred as a rule under all methods of treatment.

The treatment of joint wounds by German war surgeons underwent a decided change in the course of the war. Early in the war it was hoped that the majority of articular lesions would heal through simple fixation in plaster apparatus, but the preponderance of destructive artillery wounds later on enforced the adoption of more radical measures, especially for the large joints, with on the whole very satisfactory results. Attention was called by Hofmann, of the surgical group of Hochenegg's clinic, to the fact that complications on the part of a joint may occur also in the absence of direct articular involvement, namely, when in *gunshot wounds of bones* near the epiphysis bone fissures extend as far as the joint. Suppuration in these cases may extend to the joint by way of the bone fissures. Incision of the joint and even resection were often found to be

nadequate in these cases, and radical procedures are advocated by prominent German war surgeons who cautioned against delay if good results do not promptly follow upon treatment of the fracture and incision or resection of the joint. In these cases amputation above the fracture is indicated as soon as possible, in order to save at least the life of the patient.

Wounds of the knee joint were systematically treated in many German field hospitals with Vuzin, a quinine derivative, and according to the observations of Stieda fewer failures were noted in the sanitary stations near the front under Vuzin treatment of joint injuries than under routine employment of carbolic acid or camphorated phenol, which requires more accurate and permanent supervision.

The introduction of Vuzin into surgical practice is hailed as a great progress in wound treatment by German writers. Excellent results are claimed to have been obtained, especially in the treatment of suppurating joints, which usually healed under Vuzin therapy without complication and were not followed by permanent motor disturbances. The prophylactic employment of Vuzin was found to act as a valuable protection against wound infection, and deep antisepsis with this substance permitted primary suture of any infected territory, in the experience of some of its advocates. Shell splinters and other débris were removed from bones and joints under combined local anesthesia and deep antisepsis, and the tissues were then sutured in layers, without packing or drainage of any kind.

It is recommended to administer Vuzin at a strength of 2 per cent. dissolved in physiological salt solution which must be entirely free from soda to leave the drug its full efficiency. Novocain in a concentration of a half of 1 per cent is added to the Vuzin solution, in order to combine a prompt analgesic effect with the antiseptic action of Vuzin, which is very painful when incorporated into the tissues by itself. The technique of its administration follows the customary rules of local injection anesthesia. The remedy must be made to penetrate wherever there is the slightest evidence of infection. A single application is usually not sufficient, and the treatment must be repeated once or twice, depending upon the degree of bacterial contamination of the wound.

Transplantation of fat tissue in joint operations, for the restoration or preservation of movements (first used by Murphy in 1902), was adopted by Lexer about 10 years ago and utilized in war surgery with very gratifying results. In those particular areas where it is exposed to pressure and strain in movements of the joint, the transplanted fat tissue becomes apparently transformed into a strong connective-tissue splint which helps to preserve a movable

articulation. The fat is usually taken from the anterior, outer, or posterior surface of the thigh, sometimes from the lower abdominal region. The procedure is reserved for the treatment of ankylosis after gunshot wounds of the knee joint, in those cases where no large portions of the articular ends have been splintered and removed after suppuration. At the end of joint suppurations, fat transplantation should not be performed until at least six months have passed without reappearance of fistulas. Up to 1916 this method, according to Lexer's report, was carried out in only a very small number of injuries of the knee joint. An illustrative observation concerns a soldier operated upon 26 days after an infantry projectile had passed from above through the upper recess into the bone and lodged in the joint between the two condyles. On its removal, the articular cartilage was found to be detached from the condyles on both sides of the projectile. After the bullet had been extracted, the loose articular covering was removed and the joint surface of the femur was completely incased with fat tissue. The patient was discharged with a movable knee joint three months later. Upon the basis of its merits, the method evidently became more widely adopted as the war progressed, and Dr. Schlaepfer, assistant professor of surgery in the University of Zurich, who for two years worked as a neutral in a military hospital in Leipzic, saw two dozen cases of knee-joint injury successfully treated by means of fat transplantation.

Conservative treatment of severe gunshot injuries of joints by means of the hyperæmia method was advocated by Sehrt, who claimed that this procedure reduces the danger of general infection and local extension to a minimum, including cases of joint suppuration after gunshot wounds. General infection was prevented in the majority of the cases, and local repair could be conducted in such a way, without major interventions, as to secure a satisfactory function of the joint. Relief of pain in most cases is an important feature of this treatment. Although recent injuries of 2 to 3 days' standing are the chief domain of this therapeutic measure, it is also claimed to be highly efficient in the presence of chronic circumscribed suppurative processes. The constriction bandage is left in place during an average time of 6 to 7 days, or up to 14 days in very severe cases. The wound itself is covered with sterile gauze and left to itself, the affected extremity being put at rest in splints.

The technique of permanent constriction consisted in the application of a black rubber bandage at the thigh or upper arm, so as to leave a zone of undamaged tissue between the wound and the bandage, which was usually practicable even in lesions situated near the root of the limb. It is claimed that a very satisfactory hyperæmia can be obtained by applying the rubber band with very gentle traction, slightly more than is used in the application of a plaster

bandage. The patient should barely feel the pressure of the bandage. A visible repletion of the peripheral skin veins makes its appearance very soon after the application of the bandage and is followed a few hours later by the first signs of incipient edema, usually accompanied by a bright red color of the skin. Importance is attached to the following points: Pulsation of the peripheral arteries must always remain palpable; the peripheral part must not become anesthetic; the skin must not turn blue and cold, but red and warm; the pressure of the bandage should never be felt as pain.

For infected intraarticular gunshot fractures, typical resection is indicated as soon as the temperature reveals the onset of a grave infection, in order to guard against the loss of the extremity or life itself, in the opinion of Philipowicz. The problem of recurrent and latent infection, especially in war wounds of the large joints and bones, is a very serious one and involves the necessity of careful *aftertreatment* of all severe or badly infected injuries, more particularly those caused by artillery projectiles. Most, in his suggestions to war surgeons, pointed out the necessity of prolonged and exact immobilization of all seriously damaged and infected extremities.

Contractures were treated with very good results by means of Schede's permanent apparatus, which was left to act upon the patient as long as possible, preferably in combination with Bier's hyperæmia of the extremities. The injured leg is placed on an iron frame covered with webbing, which is perforated at the site of the wound. The leg is thus reliably protected, put at rest, and can be dressed as desired.

IV. (*a*) GUNSHOT WOUNDS OF THE SKULL AND BRAIN.

The adoption of active surgical measures in these cases by the Germans saved many lives. All gunshot wounds of the skull are regarded as infected by Müller, who operated upon 180 cases, including 6 wounds of soft parts, 60 bone wounds, and 74 brain injuries. In conformity with the rule to expose without delay all recent untreated gunshot wounds of the head, without exception, early operation was performed in 132 cases. The tense, nonpulsating dura was always incised, the cavity was drained with a rubber tube, around which gauze was packed; in the course of two to eight weeks the drainage tube was progressively shortened and finally removed. Small superficial cavities were packed with gauze. In order to guard against prolapse formation and incarceration, the brain was exposed as widely as possible. Gunshot wounds near the base of the skull gave rise to special difficulties. Of the 180 patients, 31 died, complications on the part of the brain being the cause of death in 25 cases. In purely soft parts injuries and lesions of the external table alone the

mortality was zero; in injuries of the internal table it was 2.6 per cent; in injuries of the brain, 39.2 per cent. The mortality of primarily operated gunshot wounds of the brain was 34 per cent; of secondary operations, 67 per cent. The prognosis was most serious for impacted projectiles (mortality of 70 per cent); perforating gunshot wounds, 36 per cent; glancing gunshot wounds, 34 per cent. It is interesting to note that of 103 cases of skull and brain injury, 48 men became again fit for military service.

Altogether 139 cases of gunshot wounds of the head, with 10 deaths, were reported by Uffenorde. In superficial brain wounds loose iodoform gauze packings were used; in deep abscesses large glass drainage tubes were employed; in the presence of brain prolapse, the infection was combated by antiseptic agents, such as iodine tincture, iodoform powder, or hydrogen peroxide. In all cases of brain infection urotropin was administered by the mouth. Osteoplastic repair was postponed until the end of three months, after the wound had healed. Pedunculated bone and periosteal flaps were given the preference over free transplanted bone flaps.

In discussing the treatment of gunshot wounds of the skull in dressing stations at the front, Hahn mentions favorable experiences in 632 cases, with a mortality of 11 per cent. The principal cause of a bad outcome consists primarily in wound infection, which is best controlled through the creation of aseptic surroundings. This should be followed by exploratory incision and further surgical intervention if indicated.

Primary complete closure of skull wounds, in fact of all gunshot injuries, was advocated by Barany, on the basis of 12 extremely serious cases which were cured by means of this method. In 6 cases of severe skull-splinter injuries, in highly infectious territory, Hische primarily covered the dural defect with fascia, after excision of all infected tissue, and obtained an uninterrupted recovery in 4 cases. The procedure is recommended as reestablishing physiological conditions in the cranial cavity. This view is not accepted by all German war surgeons, however, and Fraenkel, for example, cautioned against the general adoption of primary wound closure in the very changeable environment of war surgical activities. Pribram obtained only 6 primary cures among 29 cases treated by primary wound suture; in the remaining cases the sutures soon required removal. The operations were not performed until two days after the injury, but under favorable aseptic conditions. In a later contribution this observer emphasized the necessity of early operation, in order to avoid brain abscess. Upon the basis of 104 gunshot wounds of the skull, including 97 with brain lesions, Erdelyi reached the conclusion that these cases should be operated upon as soon as possible,

with removal of all kinds of foreign bodies and establishment of free drainage. Closed wound treatment did not work well in his experience, the sutures usually having to be removed soon after the operation, on account of rising temperature. Of 24 patients who were operated upon in the first three days, only 3 died; of 9 patients operated upon after the twenty-first day, 3 died. In the presence of impacted projectiles, exposure of the entrance orifice and removal of the splinters is indicated, also when the projectile itself can not at once be removed (18 cases, with 6 deaths). The treatment of encephalitis consisted in wide exposure, free drainage, removal of foreign bodies, and routine application of spiral puncture. Whenever there is any suspicion of meningitis, repeated spinal punctures, one or two daily, with evacuation of much cerebrospinal fluid (up to 50 c. c.) enter into consideration.

In a field hospital at the eastern front, Boit was enabled to observe 171 cases of gunshot wound of the skull, admitted in the course of 14 months. Of these, 79 succumbed to their injuries, although primary wound treatment was regularly carried out. Impacted shrapnel cases have twice the mortality of impacted gunshot projectiles. The prognosis in all cases improves with the timeliness of wound inspection and treatment. Another contribution from a field hospital by Blumenthal concerns 28 cases of gunshot wound of the brain, with 15 autopsy records. He points out that the hole in the bone is almost invariably smaller than the hole in the meninges, and that the hole in the dura must be exposed in a wide circumference, in order to provide an unobstructed drainage of the secretions.

The following statistical figures, given by Münch, are of interest: Of 153 cases of gunshot wound of the skull, 13 were brought to the field hospital dead and 38 in a moribund condition; 102 patients were operated on; 12 of these died.

IV. (*b*) GUNSHOT WOUNDS OF THE ABDOMEN.

Upon the basis of experience in the Balkan Wars, a number of German operators had already become firm adherents of active procedures in these cases, whenever warranted by external conditions. Many lives were undoubtedly saved by the adoption of operative measures instead of the surgical reluctance which prevailed in former wars. Importance is attached by German writers to the time interval between the infliction of the injury and the performance of the operation. They learned that the results of treatment could be primarily improved by providing the means for easy and rapid transportation of the wounded, thereby shortening the time between injury and operation. In one series of cases, for example, of the patients who could be operated upon within the first 6 hours

recovered, whereas only 1 recovered of 8 patients who came to operation between 6 and 12 hours after the injury. By means of early operative interference, Kraske saved 20 of 39 wounded, and Laewen saved 27 of 54 wounded. Among 21 cases of abdominal gunshot wounds, with gastro-intestinal lesions, operated upon by Hellwig in a field hospital, there were 7 recoveries and 14 deaths, 4 of these deaths being due to associated injuries of other organs. The majority of abdominal gunshot wounds apparently proved fatal from hemorrhage rather than from peritonitis. By some war surgeons, operative intervention was restricted to those cases which were complicated by intestinal prolapse. The majority decided in favor of early interference, whenever practicable. In a general way, the conclusion was reached that the treatment of gunshot wounds of the abdomen had to be governed not so much by surgical indications as by operative facilities. A soldier who had received 14 perforating wounds of the gastro-intestinal canal, caused by a lead bullet fired at close range, was operated upon by Küttner a short time afterwards, and his life was saved through purification of the abdominal cavity and with application of intestinal sutures. On the other hand, over 52 per cent of the wounded with gunshot injuries of the abdomen who were sent to the Infantry Division Sanitary Institute directed by Hahn, died on the way there or soon after their arrival (130 of 247 cases). Upon the basis of such observations, German war surgeons naturally insisted upon the speediest possible transportation of men with abdominal wounds from first-aid stations to the better equipped field hospitals, for the purpose of timely operative treatment. The more successful handling of these cases constitutes one of the surgical lessons that the war taught Germany.

Gunshot wounds of the chest.—According to Kehl's observations in field hospitals, the worst of the injuries caused by artillery projectiles were those produced by shrapnel bullets. The majority of patients reached the hospital in the first 24 hours after the injury; they were altogether 55 gunshot wounds of the chest, including 41 cases with pulmonary lesions; 30 wounds were inflicted by artillery projectiles, 24 by infantry projectiles, and 1 by a so-called hand grenade. Of the 30 patients wounded by artillery projectiles, 5 died; of those wounded by infantry projectiles, 1 succumbed indirectly to the injury. The nonpenetrating gunshot wounds of the chest were associated with symptoms of dyspnea, hemoptysis, and occasionally with hemothorax, but as a rule ran an afebrile course, without dangerous manifestations on the part of the lungs. When the pleural cavity was opened, the clinical picture was grave on account of the existing infection. Landois performed suture in nine cases of gun-

shot wounds of the lungs and thoracic wall in a field hospital. Four patients died and five patients with very severe open injuries of the chest wall and circulatory disturbances were saved by the operation. A simple hyper-pressure apparatus, worked by a pair of bellows, proved very useful. The thoracic wound was enlarged so that the chest cavity could be palpated with the hand; when a lung wound was demonstrable, it was closed by deep and tight silk sutures, and the lung was then sutured into the chest wall so that the pulmonary suture came to lie in the thoracic opening. In one case wound repair followed without any complication; in other cured cases an empyema formed. The costal resection, required for the drainage of the empyema, was performed at the earliest 10 to 14 days after the first operation, with careful preservation of the point of attachment of the lung.

V. IMPROVED VASCULAR SURGERY.

The treatment of vascular injuries represents a field of German war surgery which has been essentially modified through the experience of the World War. The German literature of the four war years contains many contributions on the handling of war aneurisms and other lesions of the blood vessels at the front. Prior to the war Lexer had advised that after complete or incomplete extirpation of the aneurismal sac, an attempt be made to preserve the normal circulatory channels by means of vascular suture, when at all practicable, instead of applying vascular ligatures, which involve the serious danger of peripheral gangrene. This rule was destined to exert a revolutionary influence upon the treatment of all war aneurisms and also to modify the primary handling of recent gunshot wounds of blood vessels. During the war Lexer expressed himself unconditionally in favor of early operation on vascular wounds in general, and encouraged by his success many German war surgeons began to utilize primary suture as the routine method of treatment for recent gunshot wounds of the large vessels. Rehn, who at the Surgical Congress in Brussels, in 1915, reported 421 arterial injuries, in 201 of which arterial ligatures were applied, adopted primary vascular suture in the summer of 1915, after several unsuccessful experiences with vascular ligature. His remarkable results, obtained under highly precarious external conditions, led him to urge the performance of suture as far as possible in all vascular gunshot wounds. As the war progressed and experience with these cases increased, the indications for vascular suture were gradually extended. German operators claim a remarkable favorable course of wound repair under the suture method, essentially different from and superior to the conditions prevailing after the application of vascular ligature. Plastic operations on damaged blood vessels were

proposed by Küttner in the rare cases of large vascular defects. In his experience with 105 cases of war aneurism (with one death and one gangrene), lateral suture or circular union proved usually sufficient. When plastic procedures are desirable on account of extensive injuries, the wall of the artery can be reconstructed by means of flaps from the wall of the aneurismal sac.

GENERAL REMARKS ON SURGICAL AND MEDICAL SERVICES IN GERMAN WAR HOSPITALS.

There was a tendency among German war surgeons in the early part of the war, or so it seemed to me in a cursory peep behind the enemy's lines in 1915, to pack the wounds too tightly, resulting in pus retention instead of the intended aspiration of the pus. It is more than likely that the Germans profited by the experience of French operators, with whose work they soon became familiar through bits of information obtained from wounded men who fell into their hands and other war prisoners, for the principle of extensive exposure of all wound angles, tracts, recesses, and cavities (the famous French "débridement"), with unobstructed drainage—in other words, the creation of physical conditions favorable to wound repair—was soon emphasized on the German as well as on the allied side.

During the war, judging from my personal observation and from information obtained later on from various sources, general anesthesia was usually conducted with ether. For minor interventions, ethyl chloride and morphine-scopolamine were also employed. Local anesthesia, in its varied forms, was found to be a powerful adjuvant of war surgery in the experience of German operators.

During a tour in Germany as a neutral in the fall of 1915 the careful division of labor in German war hospitals impressed me as a valuable adjunct in permitting all the wounded to be attended as promptly as possible. All bandaging and dressing material was sterilized in their fine, practically indestructible field-sterilization apparatus; every single piece of gauze, whether previously sterilized or not, was exposed to the action of steam and always transferred from the sterilizing apparatus directly to the wound. All cloths, napkins, and towels used during the operation were likewise sterilized in water vapor and rendered germ-free in the main dressing station by boiling for 10 minutes and keeping them in a strong bichloride solution. In the early part of the war there was certainly no lack of bandages or medicines on the German side, the supplies from their own or looted Belgian and French pharmacies meeting all requirements. But before the end of the war, which had outlasted all expectations, supplies of this kind, like many others, ran short in Germany and a number of saving devices were adopted. Due to the

ncreasing deficiency in suitable raw materials, many obstacles were lso encountered in the production of the urgently needed surgical nstruments.

The large bandages otherwise regularly lost in the removal of laster casts were recovered by causing such patients to sit in warm alt water; the plaster could thus be removed without hurting the earer, while the bandages could be easily rolled, sterilized, and used ver again. Paper bandages, woven like fabrics and soaked in plaster f Paris, were used to some extent for plaster dressings and fixation pparatus. Other substitutes for plaster gauze bandages came in the orm of rolls of ordinary crêpe paper, coated with a very thin solution f stearin and sprinkled with powdered plaster. In the experience f German war surgeons, these bandages after having been dipped n water proved sufficiently firm and flexible to act as a satisfactory ubstitute.

In view of the prevalent German myopia, the equipment of the ighting machine with spectacles acquires considerable interest. As arly as December of 1914 this need became apparent; and in order to nable the soldiers to shoot accurately in all positions of the body, pectacles with round glasses were generally introduced in the field rmy in April of 1915. An improved model for the wearers of gas nasks came out in the winter of 1916, and all other spectacles were radually discarded. Since November of 1917 all optic glasses were nade considerably thicker than in the past, for the better protection f the eye against injuries of all kinds.

On my tour of inspection behind the enemy's lines, in the fall of 915, I was informed that a large number of preexisting eye diseases vere first noticed in the field, or discovered as accidental findings. The number of trachoma cases was said to be inconsiderable. Special phthalmological service was requested early in the war for all field nospitals, and especially for the so-called quarantine stations. In January of 1915, 61 cases of, for the most part, very grave war in- uries of the eye were under treatment in the Tubingen Reserve Hospital.

A visit to the Sanitary Laboratory in Berlin, in the fall of 1915, mpressed me with the evidences of the well-known German efficiency. Everything was done on a large scale, great quantities of typhoid nd cholera vaccine being constantly under preparation. This large nd splendidly equipped building, under the management of a pro- essor of the University of Berlin, was reserved entirely for special vork for the army. At that time routine vaccinations for typhoid ever, cholera, and smallpox were carried out on every soldier of the great German fighting machine, in three sittings for typhoid, one or wo for cholera, and one for smallpox. No efficient vaccine against vound sepsis was then available, nor was such a vaccine evolved in he course of the entire duration of the war.

CONTROL OF WAR EPIDEMICS BY PROTECTIVE INOCULATIONS.

On turning to the medical aspect of the war, there is an outstanding fact which at once challenges attention and demands relief—*venereal diseases* ranked first in frequency during the entire duration of the war. Next in order followed *malaria;* next, *dysentery* and *typhoid fever;* last and least, *typhus* and *cholera.* In the individual years of the World War the incidence of venereal diseases remained practically the same throughout, as distinguished from the infectious diseases. With special reference to malaria, the number of cases increased in the third and fourth year of the war, probably primarily due to the advance of the German troops in the east and their sojourn in Turkey. The behavior of the infectious intestinal diseases is noteworthy, typhoid fever progressively diminishing in the third and fourth year of the war, whereas dysentery, after decreasing in the second year of the war, again increased to a considerable degree later on. Cholera was greatly inferior in frequency to typhoid fever and dysentery. The same is also true for typhus, although there was an increased incidence of this disease among the German civilian population during the first year of the war. Other infectious diseases, such as smallpox and recurrent fever, were relatively too infrequent for inclusion under the heading of German war statistics on epidemiology. As regards the management of war epidemics, German writers emphasize that due to the advance of hygiene and internal medicine, the toll taken by infectious diseases was incomparably smaller in the World War than in previous wars. With special reference to venereal diseases, the Germans claim that experience gained in the World War will prove of value and benefit after the war for the preservation of the health of the people.

Protective inoculations.—According to the experience of the World War, protective inoculations essentially facilitated and supported the control of epidemics, but they would have failed without the tried and tested hygienic measures of the past, such as a free supply of pure drinking water, proper removal of waste matter, rapid isolation of patients as well as suspected cases, thorough disinfection, and so forth. The actual value of protective inoculations can not yet be stated on the basis of statistical figures. Germany carried her protective inoculations as far as the men in the trenches at the onset of several typhoid fever epidemics in the western amphitheater early in the war, as well as against the threatened invasion of cholera in the east. Practical experience conclusively showed that the two intestinal infections for which a protective vaccine on a solid scientific basis is available, namely, *typhoid fever* and *cholera*, considerably diminished during the four years of the war. The former not only decreased numerically during these four years, but its course showed a

milder character and the mortality was proportionately lessened. In 1915, according to personal information obtained in the Berlin City Sanitary Laboratory, three vaccinations were given every soldier as a routine procedure practically at the same time—for typhoid fever, cholera, and smallpox.

Typhoid fever.—The typhoid fever incidence was kept in check during the entire war by general typhoid vaccination, including the men in the trenches. Not only the enlisted soldiers were vaccinated, but also the recruits who were about to be sent to the front. Protective vaccination was in general use by 1915, with an undeniable effect on the morbidity of typhoid fever. The mortality was likewise diminished by the vaccination.

Cholera.—The German Army remained practically free from cholera in the war. Upon the basis of their war experience, protective vaccination against cholera is now regarded as a necessary adjuvant in the fight against this disease. The authoritative textbook of Kolle-Hetsch, on Experimental Bacteriology, contains a statement to the effect that protective vaccination against cholera in the World War proved brilliantly successful in the armies of the Central Powers.

Smallpox was relegated entirely to the background during the World War in the German Army as well as in the numerous prison camps. The rare cases which occurred could always be traced to infection from the outside. All soldiers and other members of the army who had not been vaccinated for four years, or suffered from the disease itself, were revaccinated. All war prisoners were vaccinated without delay. The results of these active prophylactic measures were excellent.

Malaria.—This disease ranked second in frequency next to venereal diseases during the war, especially in the latter part, and the German-Austrian Staatsamt made malaria a reportable disease in March, 1919. Imperfectly cured cases and latent infections acquired progressive importance from year to year in the diffusion of malaria, and for the prevention of its spread the Germans devised what they call experimental activation of latent malaria cases, in the form of routine provocation of the disease by alternate heating and chilling of the body, with gentle Faradization of the splenic region on two successive days, followed by microscopic examination of the blood for the plasmodia. This ingenious procedure was first carried out practically, and on a large scale, by Hoffmann in Russian Poland. Several other methods were also suggested for mobilizing the latent plasmodia in the body and forcing them into the blood stream. However, upon the basis of a number of malaria epidemics during the war, German writers admit that prophylaxis and therapy of the disease are still capable of improvement.

Trench fever was very prevalent at the eastern front in 1916–17, and crowded the field hospitals. Its etiology was not ascertained during the war. Disinfection, destruction of lice, as well as isolation of patients, were employed for its control. Quinine and salvarsan usually proved inefficient. This disease figures in the German literature also as Wolhynian fever, five days' fever, and Werner-His disease.

No useful or reliable vaccination against *typhus* was devised by the Germans during the war. This disease was soon recognized as exclusively louse-borne, and preventable by strict isolation of the infected and vermin-infested men. In rigorous application of this principle, nothing outside of absolute quarantine of the infected camp for the protection of the civilian population was done by the Germans for the control of the severe typhus epidemic which raged among the unfortunate inmates of the Wittenberg prison camp in the winter of 1914–15.

Dysentery is said to have been an actual scourge in numerous regions of the war theater, the field hospitals being packed with patients, especially near the eastern front. Although no tried and tested vaccine was available, as for typhoid fever and cholera, some progress was made in Germany in regard to prophylactic vaccination against dysentery with Boehnke's multivalent "dysbacta." This vaccine is made from all bacteria now held responsible as pathogenic agents of dysentery and in the course of the war was employed for the inoculation of 15,000 persons, almost exclusively soldiers among whom the disease had appeared, or who were quartered in infected localities. In 86 per cent of the cases the inoculation took an entirely uneventful course, without reaction of any kind. In only 1.6 per cent a rise of temperature followed, with vertigo, headache, local swelling at the site of inoculation, and diarrhea persisting for several days. In a general way, the reaction was so inconsiderable that no precautionary measures were required. The treatment was administered in such a way that given amounts of the vaccine (0.5, 1.0, and 1.5 c. c. of dysbacta) were injected at intervals of five days. As an immediate sequel of the inoculation, latent infections manifested themselves, but after these had been eliminated only a few sporadic cases of severe dysentery occurred among the inoculated troops. Slight intestinal disturbances were not uncommon, however, and must be interpreted as an attenuated dysentery. Soldiers who had not been inoculated, on account of leave of absence, were often attacked by the disease. The inoculation evidently resulted in a relative immunity, but this does not apparently last longer than three or four months.

In spite of the enormous danger to health, incident to the masses of mobilized men, the existence of the troops under poor hygienic conditions, and the long duration of the war, Germany succeeded in

maintaining her soldiers at a high standard of efficiency and in practically eliminating the horrors of the old war epidemics. This was accomplished by the capable organization of their sanitary corps and the hygienic knowledge of her medical men, who proved themselves able to cope with the new and unaccustomed tasks arising out of the exigencies of modern warfare. German war hygiene aimed at introducing sanitary measures in the entire army, with the idea that if the vital conditions of the troops could be made hygienic by the removal of conditions likely to lead to the origin or distribution of disease, the general standard of health would be fairly high, and war epidemics would accordingly be deprived of the soil for extensive distribution. As a matter of fact, war diseases took a much smaller toll than in previous wars, the statistical data showing that Germany succeeded in keeping her armies free from epidemics and other diseases. The number of those killed by the enemy as compared to the number of those who died of disease equals about one-tenth. The proportion is readily seen by a glance at the following table, which shows the German losses:

World War, 1914–1919:	
Deaths from wounds	1,531,048
Deaths from diseases	155,013

SANITARY CONDITION OF THE GERMAN NAVY DURING THE WORLD WAR.

The strength of the German Navy (including the Marine Corps, as well as the formations in Kurland, Livland, Esthland, Bulgaria, the Ukraine, and Turkey) is calculated, according to data obtained from the medical department of the navy administration (Reichs-Marine-Amt), as follows:

First war year, 202,123; second war year, 235,267; third war year, 254,347; fourth war year, 283,071.

Of these men the following came under professional treatment: First war year, 96,894; second war year, 105,872; third war year, 112,276; fourth war year, 140,866.

These figures include war wounds as well as general diseases. Of all the wounded and sick who came under professional treatment 836 died in the first year (0.86 per cent); 740 in the second year (0.69 per cent), 1,049 in the third year (0.93 per cent), and 1,448 in the fourth year of the war (1.03 per cent). Total deaths, 4,073. Up to August 1, 1918, 5,899 men had been discharged as unfit for service, including 516 who had lost one limb and 36 who had lost two or more limbs. The number of war-blind men amounted to 17 cases.

The incidence of pulmonary tuberculosis was approximately the same during the second, third, and fourth year of the war, but the number of deaths increased considerably, from 11.1 per cent in the

first year, 10.4 per cent in the second year, to 13.6 per cent in the third year, and 18.4 per cent in the fourth year of the war.

MORTALITY IN THE GERMAN MEDICAL AND SURGICAL SERVICES DURING THE WORLD WAR.

A special inquiry into the losses incurred by Germany during the World War in medical and surgical officers has resulted in the following figures, illustrating the unprecedented exposure of members of the profession to fatal war injuries. No less than 562 were killed in battle or died of wounds received in battle; 763 died from disease or other causes, bringing the total losses to 1,325. Germany has reason to point with pride to this record of the devotion to duty of those intrusted with the care of her wounded and disabled.

Whereas former wars took the toll of at most some hundreds of thousands, the World War killed or maimed by the millions, so that in view of the tremendous numbers involved in the necessary calculations it is not possible to give exact figures within a short time after the armistice. The realization of their losses is lightened for the Germans by the reflection that during the four years of the war, as stated by Schwiening, over 10,000,000 of members of their armies (including the numerous wounded and sick who figured several times on the lists) were treated in all hospitals of the interior or near the front, with a survival of 97 per cent. For this truly remarkable result, seeing the many cases of severe traumatism and dangerous diseases, credit must be given to the German medical and surgical services. The greatest skill and most efficient organization naturally fail as regards the slain on the battle field, but the excellence of their work is illustrated by the high percentage of recoveries from wounds and disease, as well as by the low incidence of disease in their armies in general. An important chapter in the history of the World War is thus shown to be represented by the furtherance of medical and surgical knowledge under the spur of dire necessity on the German as well as on the allied side, for the healing art knows no national boundaries. Benjamin Franklin said that "mad wars destroy in one year the works of many years of peace." Medicine and surgery are perhaps the only exception to this rule, for under the stimulus of bloodshed and mutilations that clamor for repair the germs of knowledge which otherwise might have taken many years for their development often reach maturity overnight. Destructive war can not leave where it found the disciples of a constructive science so essential to the relief of its ravages. Undoubtedly all the warring nations have learned their lessons, and the future may reveal more fully than is possible at the present time and in the limits of a brief report to what extent German medicine and surgery have been furthered by these war-taught lessons.

BIBLIOGRAPHY.

Barany. Ueber Kriegschirurgie. Wiener klin. Wochenschr., 1917, xxx, p. 1598.

Bischoff. Erfahrungen mit Dysbakta im Felde. Deutsch. Militarärztl. Zeitschr., 1918, Vol. xlvii, p. 208.

Blumenthal. Beiträge zur Chirurgie der Gehirnschüsse. Deutsch. Zeitschr. f. Chirurgie, 1916, cxxxvii, p. 91.

Boit. Ueber Schädelschüsse. Medizin. Klinik, 1916, no. xl, p. 1043.

Burkhardt u. Landois. Die Infektion bei Schädelschüssen und ihre Behandlung. Beiträge z. klin. Chirurgie, 1916, c, p. 618, 12 Kriegschirurg. Heft.

Ehrmann. Behandlung phlegmonöser Processe bei Schussfrakturen. Münch. med. Wochenschr., 1916, no. 40, p. 1437.

Elschnig. Ueber Kriegsverletzungen des Auges. Medizin. Klinik, 1915, no. 20, p. 553.

Erdelyi. Ueber Schädelschüsse. Militär-Artz, 1916, 12, p. 232. Beiträge z. klin. Chirurgie, 1916, vol. 100, Kriegschirurg. Heft 15, p. 57.

Erlacher. Beiträge zur Kontrakturen; Behandlung. Münch. med. Wochenschrift, 1916, no. 6, p. 216.

Exner. Die Technik für die Kreigsinvaliden. Monograph. Berlin, 1919.

Exner. Grundsätze der Kriegschirurgie. Militär-Artz, 1914, no. 2–19, p. 368.

Fraenkel. Die offene und geschlossene Behandlung der Schussverletzungen des Gehirns. Wiener klin. Wochenschr., 1916, no. 28, p. 888.

Fründ. Primäre Wundnaht bei Schussverletzungen. Deutsch. med. Wochenschr., 1918, no. 7, p. 179.

Garré. Was hat der Kreig hinsichtlich der ersten Wundebehandlung neues gelehrt? Deutsch. Militärärztl. Zeitschr., 1918, xlvii, p. 201.

Goldammer. Blutgefässverletzungen und deren Behandlung. Wiener klin. Wochenschr., 1916, no. 20, p. 634.

Hahn. Ueber die Behandlung der Bauchschüsse am Verbandplatz. Militär-Artz, 1916, no. 11, p. 210. Münch, med. Wochenschr., 1916, no. 12, Feldärztl. Beilage 12.

Hänel. Ueber Wundbehandlung im Krieg. Münch. med. Wochenschr., 1915, no. 14, p. 485.

Hänel. Ueber Bauchschüsse. Münch. med. Wochenschr., 1916, no. 23, p. 833.

Hellwig. Ein Beitrag zur operativen Behandlung der Magendarmschüsse. Münch. med. Wochenschr., 1916, no. 11, Feldärztl. Beilage, p. 398.

Hische. Schädelschüsse und ihre operative Versorgung. Deutsche Militärärztl. Zeitschr., xlv, 1916, p. 349.

Hoffmann, W. Die deutscheu Aerzte im Weltkriege; ihre Leistungen und Erfahrungen. Berlin, E. S. Mittler u. Sohn, 1920.

Hoffman, W. Hygienische Erfahrungen, Infektionskrankheiten und Schutzimpfung im Weltkriege. Deutsche Militärärztl. Zeitschr., 1919, xlviii, p. 209.

Hotz. Aerztliche Erfahrungen aus einem deutschen Reservelazarett. Korrespondenz-Blatt für Schweizer Aerzte, 1915, no. 1, p. 14.

Hufschmid und Eckert. Primäre Wundexcision und primäre Naht. Beiträge z. klin. Chirurgie, 1917, cvi, p. 147.

Kaufmann. Herzschädigungen bei rückkehrenden Frontsoldaten. Wiener klin. Wochenschr., 1916, no. 33–34.

Kehl. Ueber Brustschüsse. Beiträge z. klin. Chirurgie, 1916, c, Kriegschir. Heft 15, p. 98.

Körte. Zur Behandlung der infizierten Knochen- und Gelenkschüsse. Berliner klin. Wochenschr., 1910, no. 2, p. 30.

Kraske. Ueber Bauchschussverletzungen. Münch. med. Wochenschr., 1915, no. 39, p. 1339.

Kroh. Kriegschirurgsiche Erfahrungen aus einer Sanitätskompagnie. Beiträge z. klin. Chirurgie, 1915, xcvii, Heft 4, p. 345.

Küttner. Gefässplastiken. Münch. med. Wochenschr., 1916, lxiii, p. 721.

Küttner. 14-fache Perforation des Magendarmkanals durch Nahschuss. Beiträge z. klin. Chirurgie, 1916, xci, Heft 3, p. 631.

Laewen. Erfahrungen zur Pathologie und operativen Behandlung der Bauchschussverletzungen. Münch. med. Wochensch., 1915. no. 39, p. 1331.

Landois. Die primäre Lungennaht im Felde. Beiträge z. klin. Chirurgie, 1916, c, Kriegschir. Heft, p. 111.

Lexer. Die Operation der Gefässverletzungen und der traumatischen Aneurysmen. Deutsch. Zeitschrift für Chirurgie, 1916, cxxxv, p. 439.

Lexer. Die Verwertung der freien Fettgewebs-Verpflanzung, etc. Deutsch. Zeitschrift für Chirurgie, 1916, cxxxv, p. 389.

Loewe. Ueber Umscheidung von Nerven, etc. Zentralblatt f. Chirurgie, 1918, no. 51, p. 927.

Manninger, John, und Parassin. Beiträge zur Kriegsheilkunde. Erstes Jahrbuch des Kriegsspitals der Geldinstitute in Budapest, 1917.

Matti. Ergebnisse der bisherigen Kriegschirurgischen Erfahrungen. Korrespondenz-Blatt für Schweizer Aerzte, 1915, 35–7; Deutsch. med. Wochenschr., 1916, xliii, p. 449.

Matyas. Ueber Bauchschüsse. Münch. med. Wochenschr., 1915, no. 39, p. 1335.

Müller. Zur operativen Behandlung der Schädelschüsse. Beiträge z. klin. Chirurgie, 1916, c, Kriegschir. Heft 15, p. 73.

Münch. Ueber Kopfschüsse. Münch. medizin. Wochenschr., 1916, no. 30, p. 1098.

Perthes. Eine wichtige Forderung für die Behandlung der Schussfrakturen. Münch. medizin. Wochenschr., 1915, no. 22, p. 754.

Philipowiz. Ein Wort für die Resektion bei Gelenkschüssen. Wien. klin. Wochenschr., 1916, no. 35, p. 1104.

Pribram. Zur Therapie der Schädelschüsse. Wiener klin. Wochenschr., 1916, no. 40, p. 1266.

Rehn. Zur Gefässchirurgie im Felde. Beiträge z. klin. Chirurgie, 1918, cxii, p. 585.

Salomon. Ueber Wundverklebung nach Bier. Münch. med. Wochenschr., 1918. no. 24, p. 645.

Schede. Hülsenextension statt Heftpflasterextension. Münch. med. Wochenschr., 1915. no. 48, p. 1667.

Schöne. Ueber den Zeitpunkt des Ausbruchs der Wundinfektion nach Schussverletzung. Deutsch. Zeitschr. f. Chirurgie, 1918, xiv, p. 1.

Schlossmann. Ueber Behandlung der Schussneuritis. Zentralblatt f. Chirurgie, 1918. no. 51, p. 918.

Schmieden. Die Knochennaht in granulierenden Wunden. Zentralblatt f. Chirurgie, 1916, no. 39, p. 779.

Schwiening, H. Sanitätsstatistische Betrachtungen. See: Hoffmann's Book, 1920. p. 224.

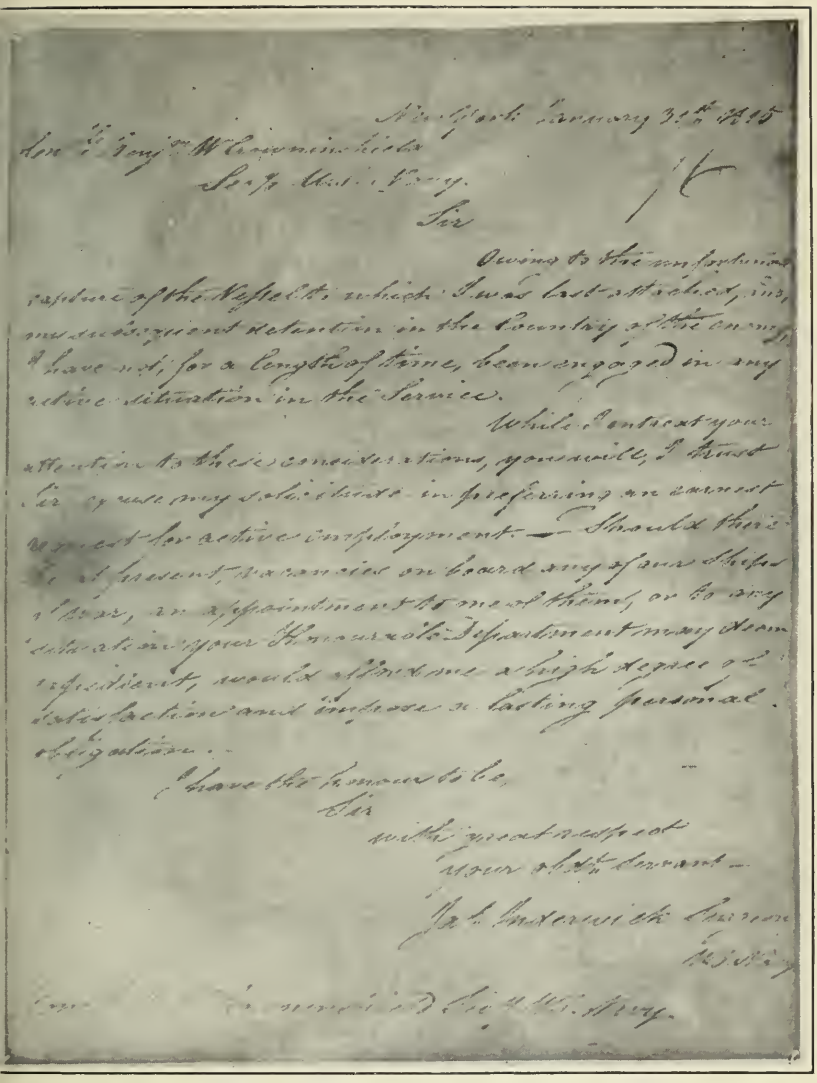
Sehrt. Die konservative Behandlung schwerer Gelenkschussverletzungen. Münch. medizin. Wochenschr., 1916. no. 10–11, p. 361. Feldarztl. Beilage.

Stieda. Beitrag z. Behandlung von Verwundungen des Kniegelenks mit Vuzin (Klapp). Münch. medizin. Wochenschr., 1918, lxv, p. 1160.

Uffenorde. Zur Behandlung der Kopfschüsse.. Deutsch. med. Wochenschr., 1916, no. 22, p. 662.

Walther. Die Behandlung komplizierter Finger- und Handverletzungen in Streckverband. Deutsch. med. Wochenschr., 1919, vol. 45, no. 38, p. 1048.

Zondek. Umbildung an Amputations-Stümpfen. Deutsch. med. Wochenschr., 1919, vol. 45, no. 32, p. 876.



New York January 3rd 1815

Hon. B. Jay. W. Crowninshield
Secy. Navy.

Sir

Owing to the unfortunate capture of the Vessels which I was last attached, and my unnecessary detention in the Country after the enemy have left, for a length of time, been engaged in any active situation in the Service.

While I contract your attention to these considerations, generally, I trust Sir you may solicitude in preferring an earnest request for active employment. — Should there at present, no vacancies on board any of our Ships of War, no appointment to the navy Yard, or to any situation in your Honourable Department may seem expedient, would Sir, me a high degree of satisfaction and impress a lasting Gratitude obligation. —

I have the honour to be,
Sir
with great respect
your obt. Servt.
Jas. Inderwick Lieut
U.S.N.

Com. [illegible] Lieut U.S. Navy.

LETTER WRITTEN BY JAMES INDERWICK TO THE SECRETARY OF THE NAVY.

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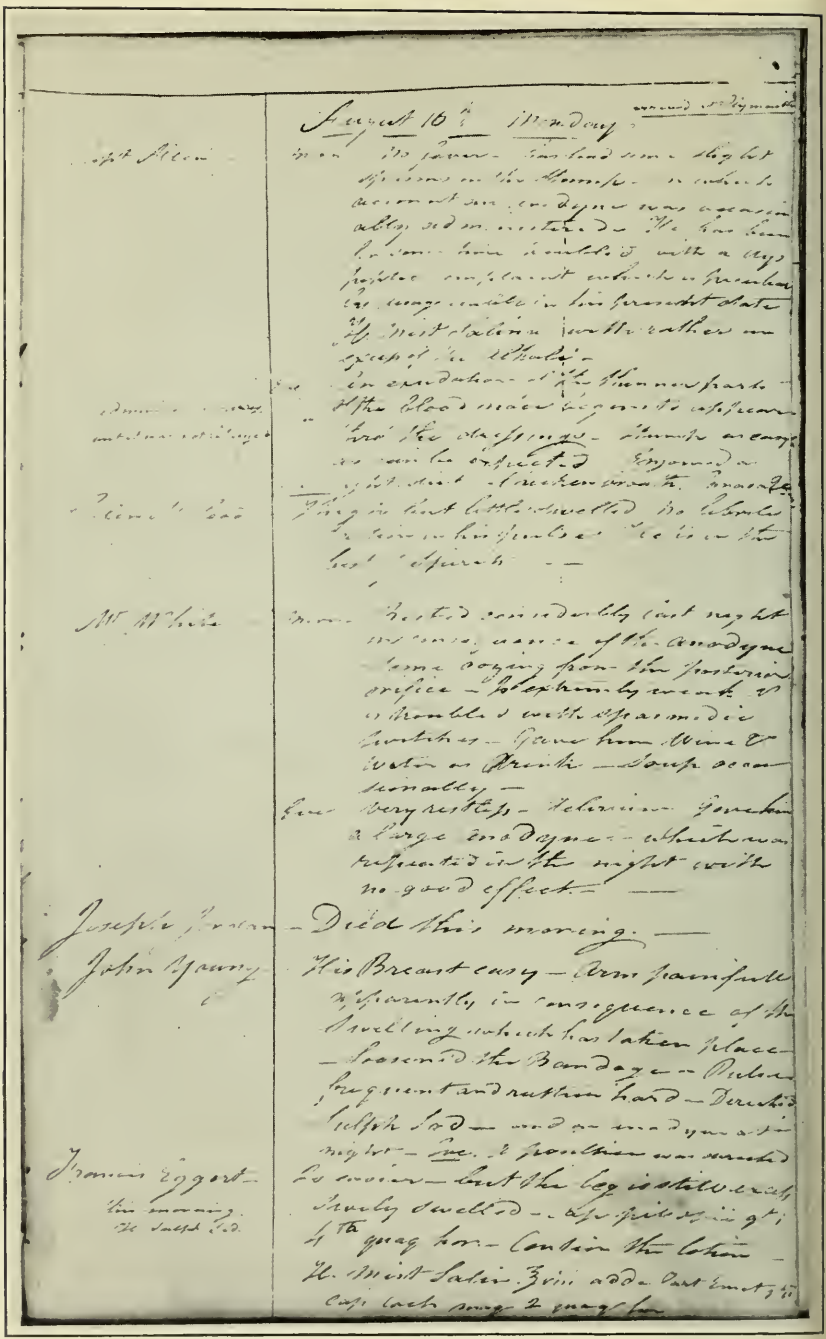

A PAGE FROM THE MEDICAL JOURNAL OF THE U. S. BRIG ARGUS.

HISTORICAL.

JAMES INDERWICK, SURGEON, UNITED STATES NAVY, 1813–1815.

By F. L. Pleadwell, Captain, Medical Corps, United States Navy.

While engaged in searching the New York Public Library for naval biographical data I was permitted, through the courtesy of Mr. Victor Hugo Paltsits, chief of the American history division and keeper of manuscripts, to examine the medical journal of a ship which, from the audacity of her operations in the Irish Sea and the chops of the Channel during the War of 1812, achieved an important notice in the naval history of that war.

The ship was the brig *Argus*, and her medical journal had only recently come to light and been presented to the library by the governors of the Society of the New York Hospital. Strangely enough, this journal was shortly followed by another from the same donors. The latter journal was that of the frigate *President* for the period May 25, 1812, to September 26, 1812, the surgeon being William M. Clarke. James Inderwick was the surgeon of the *Argus*. It is a strange coincidence in sequence of events, remarked upon by Mr. Paltsits, that Clarke was Inderwick's immediate predecessor in the *Argus*, and, furthermore, that both Clarke and Inderwick next went to ships which were mysteriously lost at sea. Clarke disappeared in 1815 while in the brig *Wasp*, and Inderwick in the same year in the brig *Epervier*. Both officers had, therefore, but a brief connection with the naval service.[1]

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[1] Dr. Clarke was appointed surgeon's mate November 25, 1809, and surgeon July 24, 1813. In 1811 he served in the frigate *United States*. On November 25, 1811, he appealed to the Secretary of the Navy for promotion. On January 26, 1812, he requested permission to resign from the Navy and enter the Army, but the request was denied by the Secretary of the Navy. Dr. Clarke was next heard from on October 7, 1813. He wrote from the *John Adams*, at Newburgh, N. Y., reporting that illness had prevented him from sailing in his ship, the brig *Argus*, and asking for duty in the *Adams*. This request was denied, and he was ordered to proceed immediately to the *Wasp*, at New London, Conn. As surgeon of the *Wasp* he participated in the engagements with the *Reindeer*, June 28, 1814, and with the *Avon*, September 1, 1814, for which he, with the other officers of the ship, received the thanks of Congress. The exact nature of the disaster which befell the *Wasp* has never become known. On the 9th of October the ship was spoken by the Swedish bark *Adonis;* and that was the last ever heard of the *Wasp*, and of those on board of her. It seems probable that, being heavily armed and sparred, the vessel foundered in a gale.

Captain Blakeley of the *Wasp* in his report to the Secretary of the Navy giving particulars of the cruise and of the engagement with the *Reindeer*, under date of July 8, 1814, from L'Orient, states:

"It gives me much pleasure to state to you the very healthy condition of the crew of the *Wasp* during the cruise; sometimes without one on the sick list, and at no time any who remained there more than a few days. Great praise is due to Dr. Clarke for his skill and attention at all times; but particularly after the action with the *Reindeer*, when his unwearied assiduity to the necessities of the wounded was highly conspicuous."

How these medical journals happened to be found after the lapse of over a hundred years, and in this locality, are questions which are difficult to answer with absolute certainty. It seems probable, however, that Clarke and Inderwick were connected with the New York Hospital in earlier years and that this association had led them to deposit the journals in this institution upon completion of a period of sea service. I have noted elsewhere the custom existing in the Navy in the early days of taking the medical journal away from the ship with other personal belongings by the surgeon when detached. The medical records were regarded as personal property in those days.[1]

Mr. Paltsits has written a most entertaining and complete account of the last cruise of the *Argus* and her engagement with the *Pelican*, to which he has added a description of the ship's medical journal. I commend this article to the notice of those who desire full details and the enjoyment of reading about a most interesting episode of the War of 1812.[2]

In planning this sketch it was my intention to add something to the material appearing in Mr. Paltsits's article regarding Surg. James Inderwick, but as I proceeded in the search for data I soon realized that he had disclosed about all that is extant. I have succeeded in finding two letters written by this officer to the Secretary of the Navy which are of considerable historical interest. One of these is reproduced in an illustration[3] and the text of the other follows:

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[1] William Paul Crillon Barton (1786–1856). Annals of Medical History, vol. 2, No. 3. The Military Surgeon, March, 1920.

[2] Paltsits, Victor Hugo: Cruise of the U. S. Brig. *Argus* in 1813. Journal of Surg. James Inderwick. Bull. of N. Y. Pub. Lib., 1917.

[3] New York, January 31st., 1815.

Hon^{ble} Benj^{m} W. Crowninshield:
Sec^{y} of U. S. Navy.

Sir:

Owing to the unfortunate capture of the vessel to which I was last attached, and, by my subsequent detention in the Country of the enemy, I have not, for a length of time been engaged in any active situation in the service. While I entreat your attention to these communications, you will, I trust, Sir, excuse my solicitude in preferring an earnest request for active employment. Should there be at present, vacancies on board any of our ships of war, an appointment to one of them, or to any situation your Honourable Department may deem expedient, would afford me a high degree of satisfaction, and impose a lasting personal obligation.

I have the honour to be,
Sir,
with great respect,
your obd^{t}. Servant,

Ja^{s} Inderwick, Surgeon,
U. S. Navy.

Hon^{ble} B. W. Crowninshield, Sec^{y}. U. S. Navy.

The following pencil endorsement by the Secretary appears on the back of Inderwick's letter:

"Order Dr. Inderwick to the Epervier, Capt Downes—and a S's mate nearest to that Station."

Boston, September 5th, 1814.

The Hon^ble^ W. Jones, Sec^y^ U. S. Navy.

Sir:

Having been appointed by Commodore Decatur as Acting Surgeon on board the late U. S. Brig Argus a short time previous to her departure from New York, and having served in that capacity until the unfortunate termination of her Cruise, I was, with her surviving officers, detained as a prisoner of war on Parole in England. I have now, Sir, however, the honour of reporting to you my arrival on the 3rd inst., at this Port, on the Cartel Ship Saratoga, having at length obtained my release and passport, as a Non-Combatant.

As Lieut. Watson, our surviving Commanding Officer, has been unable, on account of parole restrictions, to transmit any official documents relative to the action and capture of the Argus, I have the honour to enclose, for your information, a Report of the Casualties attending that event.—I regret that I have not yet been able to furnish the Wounded with the regular Certificates; it is impossible, without personal communication with them, to obtain the information necessary to the filling out of the Blanks, with the precision enjoined in the order of your Hon^ble^ Department.—

I shall with pleasure receive your commands, and will esteem it a favor, if, after so long a detention as a prisoner, my services were required as early as may be convenient, in any active situation in the Navy. I shall await, Sir, any orders you may judge proper to send me, at New York, to the Commanding Officer of which Station, I shall consider it my duty to report myself.

I have the honour to be Sir,
Very respectfully, your obdt. Servant.

James Inderwick,
Surgeon of the United States Brig Argus.

The Hon^ble^ W. Jones, Sec^y^ U. S. Navy.

The following pencil indorsement by the Secretary appears on the back of the letter:

He will remain at New York for the present. Report of killed and wounded sent to the press.

The report of casualties referred to in this letter was probably the first authentic and detailed account of the results of the action between the *Argus* and *Pelican* to reach America. The engagement took place on August 14, 1813. Inderwick reached Boston and wrote his letter on September 5, 1814, over a year later. His report was printed in a Washington newspaper, the National Intelligencer, on September 14, 1814. Lieutenant Watson's report was dated March 2, 1815, so that Inderwick's report antedated Watson's by about six months. Beyond the bare notice of the casualties suffered by this action, very little reference to the report and to the *Argus–Pelican* engagement appeared in the newspapers of that period. It must be realized that Inderwick's arrival in the country from England followed rather closely the British raid on the Capitol of August 24, 1814, and the public mind was so distracted by this event that probably little attention was given to other matters at the time.

Although forced to abandon my original project of writing a biographical sketch of Inderwick, from nonsuccess in finding additional

facts, I have resolved to avail myself of the privilege which Mr. Paltsits has himself extended of utilizing his article, adding what additional material I have been able to find in Washington. In this manner I have aimed to present to the readers of the Bulletin what is of chief interest in the story of the *Argus* and her surgeon.

It will be recalled that the brig *Argus* was refitted during the War of 1812, and came under the command of Captain William Henry Allen, formerly Commodore Decatur's first lieutenant in the frigate *United States*. In the spring of 1813, the *Argus* was selected to convey the newly appointed minister to France, the Hon. William Harris Crawford,[4] to a French port. Captain Allen was cautioned in private instructions from the Navy Department to avoid the risk of engagement with British men of war, and when the minister was landed, to continue on a cruise in the waters about Great Britain, for the purpose of raiding and destroying British shipping. Mr. Crawford was safely landed at the port of L'Orient, France, on the 12th of July, 1813, after an eventful passage of 23 days, which he refers to in a letter to the Secretary of the Navy as, "not very pleasant," qualifying this statement a little later by adding,

> but everything in the power of Captain Allen to make it so was done. The only circumstance calculated to alleviate the unpleasant sensations of a voyage at sea attended throughout with seasickness, was the acquaintance which it produced, with that most accomplished officer and gentlemanly man. I shall remember with much pleasure the hours I have spent with him on board the *Argus*, the exact discipline which he preserved, the silence and order which attended the execution of every service during the voyage and the perfect self-command which was exhibited in his every action proves most incontestably that he possesses in a high degree all the talent and professional skill which is necessary to achieve great and splendid actions. Whatever future awaits him, be it prosperous or adverse, he carries with him my esteem and my firmest conviction that he well deserves success and that the flag of the Republic will never be tarnished under his command. * * * The officers of the *Argus* were distinguished throughout the voyage by the promptitude and skill with which they executed the orders of their superior, by the order and decorum of their conduct, and by the general suavity of manner which accomplished all their actions.[5]

With Mr. Crawford securely ashore in France, the *Argus* then proceeded to carry out her more important mission. How successfully this was accomplished may be judged from the results. In a single month she destroyed 21 ships, valued at $2,000,000, and the havoc thus wrought created great consternation in British naval

[4] Mr. Crawford was appointed as successor to the Hon. Joel Barlow, who had died the previous December in an obscure village near Cracow, Poland, during a journey to Wilna, to hold a conference with Napoleon. Crawford was a Georgian, though born in Virginia. He had been United States Senator in 1807; Secretary of War; Secretary of the Treasury; and in 1824 he received the nomination for President. Illness prevented his effectual candidacy.

[5] Shipp, J. E. D.: Giant Days, or Life and Times of William Harris Crawford, 1909.

and shipping circles. This and similar raids by United States vessels did much to shorten the war.[6]

Unfortunately the successful career of the *Argus* in destroying enemy merchantmen was brought to an abrupt and somewhat inglorious termination on August 14, 1813, by encountering the British sloop of war *Pelican*, which vessel had been sent out by the naval authorities for the express purpose of checking the pernicious activities of the American vessel. The resulting action lasted only about 45 minutes, when the *Argus* was compelled to surrender. Captain Allen had his left knee badly shattered by a cannon shot early in the action, and the surgeon was obliged to amputate the limb. Allen succumbed to his injuries[7] a few days later at Mill Prison, Plymouth, England, where the officers and crew were taken as prisoners of war.[8] Lieutenant Watson, although painfully wounded himself, took over the command when Allen was struck down, but soon had to yield to the overwhelming fire of his adversary.

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[6] On February 26, 1814, the Secretary of the Navy, in a letter to Captain Lewis Warrington of the U. S. S. *Peacock,* refers to the *Argus* and her commander as follows: "The success of the *Argus*, in the course of but a few days, was astonishingly great, and had the gallant spirit of Captain Allen but submitted to the restraint of his excellent judgment, he would have rendered more essential service to his country, perhaps, than any single vessel ever did."

[7] Extract from the British Naval Chronicle:

"As several misstatements have appeared in the public print relative to the death of the late Capt. Allen, we subjoin the following particulars, communicated to us by a friend, which may be depended on: Capt. Allen's left thigh was amputated by his own surgeon, in a very proper manner, almost three-quarters of an hour after the close of the action. On the morning after the arrival of the *Argus,* the chief medical officer from Mill Prison attended him, and soon discovered that dangerous symptoms, which had escaped the observation of his surgeon, who thought favourably of his situation, were now insidiously approaching, and accordingly communicated his apprehensions, and recommended such remedies as were deemed advisable. In the evening he was again visited, when the prognostic given in the morning was found too visibly verified. On the following day his symptoms were much aggravated, and his immediate removal to Mill Prison hospital was strongly recommended, in order to obtain the most prompt remedies, and where he might have all the care and attention his situation demanded. He arrived about noon, but in spite of every effort, gradually sunk, until he breathed his last, about 11 o'clock that night, during which period he was never left by his physician." Bowen, Abel: The Naval Monument, p. 74, Boston, 1816.

[8] "This prison was situated on a promontory, projecting into the sound, between Plymouth and Plymouth Dock, * * * Formerly wind mills stood on this eminence, which circumstance gave it the name of 'Mill Hill;' hence the prison was called 'Mill Prison.' There were three buildings, one of which had been built in queen Ann's time, as tradition informs us." * * * "The hospital, consisting of thirteen wards, as I understood, and the guard house were situated southwest of our yard, at a convenient distance." * * * "However tyrannical and inhuman the British government was in other respects, they were to be praised and respected for the suitable provision they made for the sick in the hospitals at Mill Prison. It was a great blessing to the sick in those hospitals, that they were under the care of such a physician as doctor Ran, and that the nurses should be under the care and direction of a man so affectionate and faithful as was Mr. Lawrence." (Memoirs of Andrew Sherburne, A Pensioner of the Navy of the Revolution, written by himself. William Williams, Utica. 1828.) Gustavus Conyngham, a Captain of the Continental Navy, was an inmate of this prison during the Revolutionary War. (See "Letters and Papers relating to the Cruises of Gustavus Conyngham, a Captain in the Continental Navy, 1777–1779. Neeser. Naval Hist. Soc. 1915.) Richard Dale and Joshua Barney were also inmates of this prison.

While the *Argus* resisted stubbornly, the damage received by her opponent fell so far short of what contemporary experts thought she should have accomplished, in view of her weight of metal, and particularly in view of Captain Allen's previous great success in training guns' crew on the frigate *United States*, that public opinion forced a court of inquiry. This was held in Baltimore on the U. S. S. *Java* in April, 1815. Several officers, formerly of the *Argus*, testified to the incidents of the cruise, and to the conditions surrounding the action, and the final surrender. There were discrepancies in the testimony given, particularly as to the number of the crew of the *Argus*, and, more naturally, as to the number of the crew, and the number and character of the guns carried by the *Pelican*, but there was unanimity of opinion on one point, and this was that the constantly recurring encounters with British vessels, the burning of prizes, and the disposal of their crews had laid a heavy physical burden upon the officers and crew during the two weeks preceding the engagement. As a consequence, they came to their quarters for action early on the morning of August 14, 1813, thoroughly tired out from their exertions and from loss of sleep. One officer testified that the crew had had scarcely 48 hours sleep in the past two weeks, and that many of them had only been turned in for 10 minutes after the work of the previous night, when the *Pelican* was sighted at 4 a. m. Two hours later they were engaged.

The court found, in substance, that the uninterrupted activity of the preceding two weeks, due to frequent captures and burnings of prizes of war, had deprived officers and men of rest and sleep to the point where they were physically exhausted.

Testimony was given that Captain Allen, realizing this state of affairs, was reluctant to engage, and that, if it had been possible, he would have avoided an encounter until his crew had rested sufficiently. The action, however, was apparently unavoidable. Under the conditions named, the *Argus* was outmatched by the *Pelican*, whose men were fresh from port. There was evidence, too, that the *Pelican* was somewhat superior to the *Argus* in number and weight of guns, as well as in number of crew, although this latter point is in doubt.

The testimony before the court gave no indication of incapacity from other causes, such as overindulgence in port wine taken from a prize the previous evening, which has been alleged in some accounts,[9] nor any evidence of treason on the part of personnel, except that one man, at a gun, rammed home a shot first, instead of the powder charge, which rendered the gun useless, and a powder

[9] Cooper, J. Fenimore: History of the Navy of the United States. Vol. II, p. 113.

boy deserted his post of duty during action. Both of these individuals later claimed to be of British nationality.

Inderwick, whose testimony would have been invaluable upon many of the questions asked by the court, did not appear, as he was at this date on the brig *Epervier* in the Mediterranean Squadron under Commodore Decatur.

Those who have read the writer's biographical study of Doctor W. P. C. Barton, the first Chief of the Bureau of Medicine and Surgery, will recall that he served with Commodore Decatur and Captain Allen on the frigate *United States* in the year 1809–10. On June 22, 1812, being then on duty at the navy yard, Philadelphia, he received orders to the brig *Argus*. But Barton protested against being assigned to a brig after service in a frigate, and apparently the protest was effective, for Clarke remained as surgeon of the *Argus* until relieved by Inderwick. This nonacceptance of sea duty by Barton in time of war "came home to roost" some years later, and was a serious cause of annoyance to him, when the circumstance was utilized by his enemies in their efforts to disparage his record and secure his removal from the bureau. Moreover, by his failure to accept service in the *Argus* he lost the distinction which came to Inderwick of making one of the most eventful short cruises in the history of the Navy and of taking part in the spirited action with the *Pelican*.

Of James Inderwick's nativity, family origin, and early history the available records are silent. Not even a letter of acceptance of his commission is to be found. As stated in one of his letters (quoted in this article), he was appointed an acting surgeon by Commodore Decatur, for service in the *Argus*. The process of appointing a medical officer in the early days of the Navy was a very informal proceeding. A captain assigned to the command of a ship would often ask a doctor whom he knew and favored, to make the cruise, and then request the Secretary of the Navy to grant a commission as surgeon's mate or surgeon to the individual selected. Inderwick appears to have been appointed in this manner. In an early Navy Register he is entered as having been commissioned a surgeon on July 24, 1813, on which date the *Argus* was cruising in the British Channel.

Mr. Paltsits's article gives the following details respecting his career before entering the Navy:

> In the matriculation register of Columbia College James Inderwick is registered as a student in the school of arts, graduating A. B. in 1808. He is also registered as a student in the medical school in 1808–9, taking courses in anatomy and chemistry. He received his master's degree elsewhere and pursued his medical course at some other medical school or became associated with some physician. His name does not appear in the New York directories; there

is no further record of him at Columbia, and he is not registered at the then newly organized College of Physicians and Surgeons. [A letter from Mr. Paltsits of recent date states that since the publication of his article he has discovered that Inderwick was a student at the College of Physicians and Surgeons, F. L. P.] His autographs in the register of Columbia College leave no doubt that the naval journal was written by him notwithstanding that his name nowhere appears in the journal itself. Dr. Inderwick was house surgeon at the New York Hospital from February, 1812, to February, 1813.

Inderwick's previous service in the New York Hospital thus supplies a plausible explanation for the discovery in this institution of the journal of the *Argus*.

As previously noted, Dr. Inderwick's next duty was as surgeon to the brig *Epervier*, a refitted prize of war. On March 12, 1814, Master Commandant Lewis Warrington ran the blockade of New York Harbor and sailed to the southward in a new sloop of war, the *Peacock*. On the morning of April 29 he sighted the British brig *Epervier*, and in the action which resulted the *Epervier* surrendered and was taken as prize into Savannah. Here she was refitted and added to the Navy of the United States.

In the interval between Inderwick's arrival in Boston from England on September 5, 1814, and his orders to the *Epervier*, which followed the appeal for duty contained in his letter to the Secretary of January 31, 1815, there is no record of his activities. The pay roll of the *Epervier* shows that he joined the ship on February 9, 1815.

The *Epervier* was one of the vessels comprising Decatur's squadron sent to the Mediterranean in the spring of 1815 in connection with the Algerian troubles. When the treaty with Algiers was signed, Decatur selected the *Epervier*, with Lieutenant Shubrick in command, to convey a copy of the document to the United States and carry home the 10 United States citizens recently liberated from Algerian prisons.

On the 14th of July, 1815, the *Epervier* passed the Straits of Gibraltar homeward bound. This was the last that was seen or heard of her, although there was an ill-defined report that she was sighted under double-reefed topsails on August 8 by a merchant vessel at a point well to the northeastward of Bermuda.[10]

The following extract, referring to the catastrophe, is from the Analectic Magazine and Naval Chronicle, 1816, page 250:

> Lieutenant Shubrick was despatched to the United States in the *Epervier*, sloop of war, to bear the tidings that the barbarian was humbled and the captives set free. But the ill-fated vessel never reached her destination. Everybody recollects the terrible storms which at the period of her expected arrival swept the coast from south to north and destroyed many a good vessel. In one of them, in all human probability, the *Epervier* foundered and every soul perished. We can not contemplate this doleful calamity without sensations of

[10] Niles Register.

he most melancholy cast. We every day see awful proofs of the inevitable lestiny of man, and every day hear of numbers going down to the tomb in the ommon course of nature. But there is a character of deep and awful grandeur s well as of affecting pathos in the bitter uncertainty which envelopes the fate f so many human beings. We know that they are dead, and that is all that ve know.

Whatever may have been the circumstances attending the fate of nderwick and his shipmates, it is certain they will be classed among he heroes in the history of our Navy who served their country well vhen its rights were at stake.

The original manuscript journal of Dr. James Inderwick occupies 4 pages of a small folio register, beginning on the first page with he heading: "Report of Sick on board U. S. Brig *Argus* W. H. llen, Esq. Comdr." followed by the first entry on Tuesday, May 11, 813. The last entry is Saturday, August 21, of the same year. On front flyleaf there is a calculation of the persons on board the *rgus*, consisting of "Officers and men 150. Passengers 3. P(assengers) Servants 2—155 Souls."

The following selections from the journal give a picture of conitions on board the *Argus* before and after her engagement with the *elican:*

August 10th Tuesday at sea.

About 2 A. M., weather foggy, 4 large sail were discovered close aboard to indward. Soon after as day broke a large fleet were observed around us. ne of the vessels near us proved to be a Frigate within musket shot of us. he did not discover us until we had gained the weather gage, when she made ail, but could not come up. She made signals and another more to leeward ade sail, a man of war Brig, at the same time lying too for us on our larboard ow. We ran nearly close aboard of the Brig in perfect silence—men concealed t quarters, we passed and she did not molest us. About 8 A. M. sent our oat aboard a Schooner The *Cordelia* from Antigua for Bristol, one of a fleet f 400 sail. Destroyed her Cargo consisting of Sugar & Mollasses. Put all ur Prisoners aboard and sent her as a Cartel. While engaged with this essel another Frigate passed close to use. The fog clearing a little below; we ould percieve (*sic*) her hull and ports but not her Masts or rigging. She did ot observe us.

August the 11th Wednesday at sea standing towards Bristol Channel.

Came up with another part of the fleet this morning and after a chase of 4 our[s] Captured a large Ship the *Mariner*—laden with Sugar &c Bound to ristol. Sent Mr. Allen[11] aboard with directions to stand after us. Crowded il sail after another to leeward—12 Sail in sight in that direction—A Brig & utter to windward—after a long chase captured the other named the *Betsy*

[11] Lieut. William Howard Allen is meant. He was mortally wounded in an action gainst about 100 pirates near Point Hycacos, on the north side of Cuba, on November 1822. As he was expiring, he expressed satisfaction that he was dying in the service his country.—*American State Papers—Naval Affairs*, 1: 823–824. Watson subsequently revenged the loss of his old comrade by a successful slaughter of pirates, and ed in the service with a fine record.

laden with Sugar—at the same time captured a Pilot Boat Cutter *Jane*—Soon after, a Brig and a Cutter Sloop from Poole to Liverpool with Clay. Sent in the Prisoners in the Brig. Sent in the *Betsy* a prize—Burnt the Mariner—Sunk the Cutter Sloop.

10 oClk P M captured another Cutter Sloop the *Dinah & Betty* from Cork for I(l)fracombe with cattle. Killed and got on board 2 head—Burnt her.

August 12th Thursday at sea off the Saltees, Ireland.

Captured a new Brig called the Ann from Cardigan to London with Slate and Welsh Woolens. Sunk her. Brought too a Portuguese Brig bound to Cork—Sent the Prisoners from the 2 last prizes on board of her. Gave chace to two large Ships and a Brig to leeward—Allowed the Brig to Pass us and continued the chase after the large vessells—All showing English colors. One ship showing 18 ports the other 16 apparently preparing for action. Brought them too and sent Mr. Allen on board the largest the Captain of which refused to come on board us; and before our boat had returned the(y) both made sail keeping close to each other. Made sail and engaged them both. The large one struck after receiving 2 broadsides—chased the other close in and she escaped among the Saltese rocks. The large one proved a Scotch Ship the *Defiance* mounting 14 long nines 21 men—from Greenock to Newfoundland.

August 13th Friday idem.

At 2 oClk A. M. captured a large Brig the *Baltic* one of the W. I. fleet laden with sugar bound to Dublin—at 5 a Sloop laden with deal boards—at 6 burnt the *Defiance* and the *Baltic*—threw overboard the cargo of the Sloop and sent her away with the Prisoners at 9 P M—fired a gun and brought too a large Brig the *Belford*—which had nearly ran aboard of us—She proved to be from Dublin bound to London laden with linen wine &c worth 100,000 £—Took out of her a box of Plate and at 12 o Clk burnt her.

August 14th Saturday St George's Channel

Early this morning came to action with a large English Brig. She captured us after an action of 45 minutes. She proved to be the *Pelican*.

August 15th Sunday at sea.

The following list comprehends the number of killed and wounded on board of our vessel as far as can be at present ascertained.

Mr. Wm. W Edwards Midshipman. Killed by shot in the head.

Mr. Rich[d] Delphy Midshipman. Do. Had both legs nearly shot off at the knees—he survived the action about 3 hours.

Joshua Jones Seaman—Killed.

Geo. Gardiner Seaman—His thigh taken off by a round shot close to his body. he lived about ½ an hour.

Jn° Finlay Seaman—His head was shot off at the close of the action.

Wm Moulton Seaman Killed.

Total 6.

The following were wounded viz

W[m] H Allen Esq—Commander—His left knee shattered by a cannon shot. Amputation of the thigh was performed about 2 hours after the action—An anodyne was previously administered—An anodyne at night.

Lieut Watson—1st—Part of the Scalp on the upper part of the head torn ff by a grape shot—the bone denuded. It was dressed lightly and he re- rned and took command of the deck. Now on board the *Pelican.*

Mr Colin McCloud—Boatswain—Received a severe lacerated wound on the pper part of the thigh, a slight one on the face and a contusion on the right oulder. Dressed simply with lint and roller Bandage.

Mr. James White—Carpenter—Shot near the upper part of the left thigh— one fractured. Hemmorrhage considerable—Dressed the wound with lint nbued with ol. olivar—applied bandage and Splints—anodyne at night has also n incised wound in the head—Dressing—Suture—Adhesive plaster & double eaded roller—

Joseph Jordan—Boatswains Mate. Has a large wound thro the left thigh ie bone fractured and splintered,—the back part of the right thigh carried off id nearly the whole of the fleshy nates carried away—Dressed with lint• nbued with ol olivar—gave him a large anodyne—repeated it at night—Case ɔpeless.

Jno. Young—Quarter Master—Received a severe shot wound in the left reast seemingly by a glancing shot. The integuments and part of the extensor uscles of the hand torn away—Dressed lightly with oil and lint with appro- riate bandages—gave him an anodyne at night.

Francis Eggert—Seaman—Has a very severe contusion of the right leg with small gun shot wound a little above the outer ancle no ball discoverable— ressed the wound with lint & bandage & directed the leg to be kept con- antly wet with Aq. Veg. Mineral—3 hours after reception the leg was swelled id very painful gave him an anodyne—Proposed Amputation but he would not nsent. This morning the leg excessively tense—swelled—vesicated—and of a ark color about the outer ancle—Has considerable fever Directed the saline ixture with occasional anodyne To continue the lotion.

John Nugent—Seaman—Gun shot wound in the superior part of the right igh about 2 inches from the groin—Thigh bone fractured and much splintered— ll supposed to be in—Several pieces of bone were extracted but the ball was ɔt found—Dressed lint Bandage with splints—Anodyne—Rested considerably ell last night but there has been a large oozing from the wound—Applied fresh it. No fever.

Charles Baxter—Seaman—Has a lacerated wound of the left ancle—The wer part of the fibula splintered—apparently affecting the joint. Has much emorrhage from this wound. He has also a gun shot wound of the right thigh. ie ball has passed obliquely downwards thro the back part of the thigh. proposed the amputation of his left leg but he would not give his consent. ressed both wounds with lint & Roller Bandages—Made considerable com- ession on the left foot in order to restrain the bleeding—Has some fever this orning. H. Mist. Salin—Tamarind water for drink—low diet.

James Kellam—Seaman—Lacerated wound of the calf of the right leg—also wound in the ham of the same Extremity—Dressing simple—Today the leg mewhat swelled and painfull—slackened the bandage.

Wm. Harrington—Seaman—Complains much of pain & soreness in the all of the back and nates. It is suspected that he has received a severe con- sion on the parts. H. Anodyne at night—N. S. ad ℥ xvi. Apply continually q. Veg. Min to the parts.

Jas Hall—Seaman—Has a slight wound above the left eye—I suspect caused a splinter—Dressing simple.

Total ascertained—12.

Owing to the disordered state of the vessel the wounded have wretched ac- mmodation—if that term may be used—I endeavoured to make their condi-

tion as comfortable as possible—Divided, those of our people who remained on board, and were well, into watches—in different parts of the vessel—Mr Hudson Mr Dennisson & myself sitting up with the Captain—Directed Lemonade & Tamarind water to be kept made and served to the wounded.

August 16th Monday arrived at Plymouth.

Capt. Allen—Morn—No fever—has had some slight spasms in the stump—on which account an anodyne was occasionally administered—He has been for some time troubled with a dyseptic complaint which is peculiarly disagreeable in his present state. H. Mist Salina with rather an excess of the alkali.

Eve—an exudation of the thinner parts of the blood now begins to appear thro' the dressings—stump as easy as can be expected—Enjoined a light diet—Chicken broath, Panada &c—Administered a purg. but it was not retained.

Colin McLeod—Thigh but little swelled. No febrile action in his pulse—He is in the best of spirits.

Mr White—Morn—Rested considerably last night in consequence of the anodyne—Some oozing from the posterior orifice—Is extremely weak & is troubled with spasmodic twitches—Gave him wine & water as drink—Soup occasionally.

Eve—very restless—delirium—Gave him a large anodyne which was repeated in the night with no good effect.

Joseph Jordan—Died this morning.

John Young—His Breast easy—arm painful apparently in consequence of the swelling which has taken place—Loosened the Bandage—Pulse frequent and rather hard—Directed Sulph Sod—and an anodyne at night—Eve. A poultice was directed.

Francis Eggert—this morning H. Sulph. Sod. Is easier—but the leg is still excessively swelled—Cap pil opii g^r i 4^{ta} quaq hor.—Contin. the lotion—H. mist Salin. ℥viii adde Tart Emet g^r ii cap lact mag 2 quaq hor.

John Nugent—Is easier than could have been expected. Has some fever today—H mist Salin cum Tart Emet.

Charles Baxter—Considerable oozing yet from the ancle. Pulse frequent—Contin. mist Salin.

Ja^s Kellam—Has some fever to day—Complains much of soreness—Directed a cataplas(m).

W^m Herington—The same—Contin. the application.

Ja^s Hall—Eye a little sore—No complaint.

Our wounded are in a distressed condit'on. The riotous behaviour of the captors is such that they have no rest whatever and are frequently trodden upon and bruised by them.

Directed to day thin Chicken broth to be served out to them with their light Nourishment.

August 17th Tuesday Plymouth.

The wounded and sick Seamen were this morning carried to the hospital—Mr. Hudson attended them thither—I requst'd him to enquire what accommodation he could find for the captain at the Town as the noise & tumult on board is very disagreeable.

Cap^t Allen—Stump in a good state—but little soreness—but has some fever this morning—Took an anodyne last night—dosed at times—the sickness of stomach & vomiting continues—He takes the Saline mist occasionally—but without relief—He is allowed wine in his drink—Diet Chicken broath—Panada &c—Injected a Cathartic enema.

This afternoon I obtained permission to go to town for the purpose of iring private lodgings for the Captain. On return found him worse. Vomting more frequent. Pulse weak and frequent—Skin cold—now & then roubled with Hiccup—Mind, at times, wandering—false vision—Directed a wine glass full of Wine every hour—Ether & Tinct of Opii occasionally or the hiccup which did not often after recur—Lime, water & milk was adinist(er)ed as an anti emitic but with little relief. Soda water was also ccasionally given—Applied hot fomentations to the region of the stomach ith anodyne linime(n)t.

August 18th Wednesday.

Cap[t] Allen—Passed a very restless night—vomiting continues, altho' wine & ccasional anodynes seemed to relieve it.

This morning I dressed the Stump assisted by the Surgeon of the *San Salador* Flag Ship. Found the incision united but a little at the inner angle—urface flabby. Discharge thin, sanious—Whole appearance exhibiting a want f action in the parts.

On consultation with the Surgeon of the Flag Ship and, with Dr Magrath of ie Mill Prison Hospital, it was agreed to have him removed thither—Mr Denison, Mr Hudson, & myself were to be favoured with the liberty of reaining with him untill the event of his case was determined.—The disagreeble condition of the vessel,—his danger, and the eminent medical assistance t the Hospital concur in inducing us to adopt this plan.

11 A M Cap[t] Nash of the *San Salvador*, sent his launch with a large cot lung in it.

12 M Arrived at the Hospital and found a neat & commodious apartment eady—on arrival he complained of languor & appeared somewhat fatigued—glass of wine reviv'd him—vomiting continues—By the direction of Dr Iagrath a mist Ether & laud with an Infusion of P Peruv. was given him & a iniment composed of Camph. opium and oil was rubbed on the Epigrastric egion, but without effect—Skin moist & cold—A blister was applied to the omach and bottles of warm water to his foot—Abdomen humid—Has had no assage from his bowels, except 2 evacuations yesterday, in consequence of ie Enema Dr Magrath advised a purg—Cal. et P Rhei was given in balm—It as soon afterward rejected.

9 P. M.—Pulse feeble, frequent, interrupted, skin covered with a clammy oisture—Vomiting continues unabated notwithstanding the use of anti Emetic emedies—Since last report has taken Alkali & lime juice administered sepaately—is now using Soda Water supersaturated with Carb. Acid Gas.—He is xtremely restless, desireing often to have his position altered—Comatose elirium with startings—subsultus tendinum.

11oClk P M. He died.

To the time of Cap[t] Allen's death, Dr. Magrath & his assistant Mr Allan emain'd with us and afforded every assistance possible.

(No entry made August 19–20.)

August 21st Saturday—Mill Prison

Attended the funeral of Cap[t] Allen with Mr Denison, Mr Hudson & Mr nelson as Mourners.

EDITORIAL.

THE THREE HORSEMEN AND THE BODY LOUSE.

One can not read the wonderful description of typhus given by Hirsch in his Handbook of Geographical and Historical Pathology, and his equally wonderful description of relapsing fever, without admiring him who could collect so much accurate information and appraise it with such precision. At the same time we marvel oftentimes at his conservatism, for repeatedly he stands face to face with the vector of typhus and yet he will venture to think unorthodoxly.

At the time of publication of the second German edition of Hirsch's book (1881) the importance of intermediaries in disease transmission was not known, and it was 12 years later before it was first definitely pointed out by Smith and Kilborne, so that the profession was dominated by other ideas in regard to the manner in which contagion traveled from person to person. Food, filth, fomes and famine within themselves constituted the big idea in the propagation of pestilences. Hirsch knew that typhus and relapsing fever were closely related in their method of transmission. All through his discussion he compares the two diseases, and shows their epidemic coincidence in many parts of the world. He speaks of the fact that typhus seems to draw the line when it comes to hot countries, and if it does occur in them, does so at the higher altitudes where the temperature is lower. He instances the occurrence of typhus in the hill country of Persia and of the "tabardillo" in the "tierra fria" and "Sierra" regions of Mexico, Chili, and Peru, those regions with an isotherm of 68° F. (20° C.) and upward seeming to enjoy an immunity to typhus.

Hirsch knew that the virus of relapsing fever was the Spirochæte discovered by Obermeier, and that it was transmissible to monkeys by inoculation. He knew how closely typhus was linked with war, famine, and misery, as is shown by his vivid and oft-quoted opening sentence: "The *history of typhus* is written in those dark pages of the world's story which tell of the grievous visitations of mankind by war, famine, and misery of every kind." Some of the descriptions of this author of the wretchedness of the conditions under which typhus and relapsing fevers counted their victims are vivid in the extreme. The tendency of these two "famine" diseases

to confine their attention in peace time to the "proletariat" and to be generally sharply delimited to the lower strata of society, occurring in the upper classes only under special conditions of enforced overcrowding, should have been significant facts for so discriminating a thinker along these lines. Had the older epidemiologists only seriously thought of some of the personal peculiarities of those who got typhus and relapsing fevers the history of the discovery of the principle of disease transmission by arthropods would doubtless be different. Professor Hirsch might have formulated this into an alliterative dictum as follows: "The personal peculiarity of the proletariat is the possession of pediculi." Undoubtedly, had this been said, some enterprising investigator would have looked into the pediculus (literally speaking) long before this was actually accomplished.

The following paragraph copied from Hirsch on the matter of relapsing fever is calculated to cause any World War veteran to assume the attitude so beautifully shown in pictures of the Emperor Napoleon:

"From the number of laundry women that have been attacked," says Cormack, of the epidemic of 1842 in Edinburgh, "it appears that the clothes of our fever patients are especial repositories and communicators of the morbid poison." Donbowitzky also, for St. Petersburg, mentions the conveyance of the disease by infected articles of clothing. Messrs. Wyss and Bock adduce from the Breslau epidemic of 1868 a series of observations which seem to prove the protracted clinging of the morbid poison to rooms that had been occupied by the sick, as well as the conveyance of the disease by healthy persons and by effects (here also especially in washerwomen). Further, there are two really classical examples given by Parry from the epidemic of 1869 in Philadelphia, of infection by articles of clothing which had been worn by relapsing-fever patients during their illness. Clark relates that the first case of relapsing fever in New York, in 1870, occurred in a house which was the seat of a brisk old clothes trade between that city and London, the conjecture naturally arising that the morbid poison had been imported with these articles from London where the disease was then epidemic.

Looked at from the standpoint of 1921, we might easily picture the above-mentioned clothes taking to their "pediculi" and walking off.

With our present knowledge of the vectors in these two diseases many points in the epidemiology of typhus and relapsing fevers are explained. Famine, war, and misfortune promote filth and the breeding of those "beasts" which transmit pestilential diseases. They furnish the background, and vermin the active instrument of pestilence.

Typhus virus is more fastidious as to its vector than is the relapsing fever spironema. The former requires the louse and, as far as epidemics are concerned, the *clothes louse*, while relapsing fever will permit itself to be transmitted by lice, by several species of ticks, and perhaps by bedbugs and mosquitoes. The clothes louse requires cer

ain conditions of temperature and humidity for its favorable propagation. When climatic conditions are unfavorable for the propagation of lice, the two viruses part company, and if the *Spironema recurrentis* can utilize other arthropods of the vicinity it does so. It is reasonable to suppose that during the 429 years since the discovery of America opportunity has been afforded for Europe to exchange pediculi (containing both viruses) with every maritime country on the globe. Spain has been repeatedly ravaged by typhus, two epidemics mentioned by Hirsch being those of 1489 and 1557, the latter epidemic continuing for many years. From Spain Mexico got her typhus and the Spanish American countries their relapsing fever. The Conquistadores doubtless presented these countries with both typhus and relapsing fever viruses done up in one package (*Pediculus vestimenti*). The relapsing virus being the hardier of the two betook itself to ticks, while typhus had to remain content with its less flexible vector, the clothes louse. This same principle has undoubtedly operated to separate the viruses in all tropical countries so that we have the East Indian relapsing fever and the Tropical African (tick) fever, apparently unaccompanied by typhus.

"*In Which Appear*" *Three* "*Horsemen*" *and the Cootie.*—"And I looked, and beheld a pale horse; and his name that sat on him was Death, and Hell followed with him. And Power was given unto them over the fourth part of the earth, to kill with sword, and with hunger, and with death, and with the beasts of the earth." (Rev. VI, 8.)

"The Apocalypse was written about A. D. 96. Its object, like other Jewish apocalypses, was to encourage faith under persecution; its burden is not a call to repentance but a promise of deliverance" (Enc. Britt. 11th Vol. II, p. 174).

Seventeen hundred and ninety-seven years after The Revelation of St. John The Divine, his faith began to be realized, for in 1893 two American scientists showed that cold-blooded animals transmit protozoal diseases, and 16 years after the latter date (1909) three French scientists showed that the "chief beast" of Pestilence is Pediculus vestimenti. How slowly and with what great labor does truth dawn upon the human mind, and how lagging is humanity in its application! If we could "unhorse the arthropod," most of the world's pestilences would vanish.

The human being takes to totemism by instinct. He revels in symbolism. In the Cross we grasp the essence of Christianity. In passing, it might be well to observe that the Cross furnishes an instance of complete reversion in our ideas of a symbol, for, while it was used in religious symbolism for perhaps 10 centuries before Christ, it was also used as a means of capital (crucial) punishment, and hence as symbolic of degradation.

Other instances of our desire to "sense the essentials" in symbols are given by heraldry and by the varied coats-of-arms of nations. For some reason, too, though we strive for *peace*, most of these "totems" hark back to war as representing the "crux" of our ideas. Our own coat-of-arms amongst other things has the shield (an implement of defense), the cluster of arrows (offense), the eagle (a bird of prey). Other nations sense their national ideals in varied arrangements of swords, clubs, guns, crowns, snakes, lions, tigers, eagles and double-eagles, with now and then a cross or an olive branch included to show how peaceable we want to be. This, however, is beside the question. It is intended only to clinch the statement that the symbol of our faith is something we don't reason about but simply accept and believe. In matters which represent the best opinion of the ages this is as it should be. It has the *dis*advantage of being liable to obsolescence.

The louse has been an associate of man ever since he *was* a man. The clothes louse probably made its appearance soon after man became *hu*man, i. e., when he began to wear clothes. The human being has always found it distasteful to confess anything bad about himself, so he didn't publicly acknowledge this unwholesome association until 1671, when the Italian scientist Francesco Redi had the fortitude to recognize our pal and give him a name. He called the animal Pediculus ordinarius, because it was so ordinary to have "a few" in those days. This "ostrichlike" tendency of man to try and shut out from the senses the disagreeable things of life has cost the race dearly. It is futile, of course, to speculate on the amount of misery and death the human race would have avoided had the writer of Revelations symbolized filth and pestilence by the louse, but it is safe to say that the teaching effect of Ibanez's remarkable book upon the popular mind would have been enhanced by using the "cootie" as symbolic of Pestilence and Death.

The practice of the modern sanitarian of using a symbol to drive home a basic idea is psychologically sound.

(C. S. B.)

CLINICAL NOTES.

OTE ON THE USE OF MERCUROCHROME–220 WITHIN THE PERITONEUM.

By Lucius W. Johnson, Lieutenant Commander, Medical Corps, United States Navy.

I have recently used Mercurochrome–220 in 5 cases of perforative ppendicitis with very satisfactory results.

In each case the peritoneal fluid was cloudy, the appendix had erforated and there were pus and plastic exudate about the ap-endix. In the first case about 10 mils of 2 per cent solution of Iercurochrome–220 were introduced into the region of the abscess nd the wound closed with a small drainage tube, which was removed t the end of 24 hours. The muscle and fascial layers were also wabbed with the solution. In the other cases the method was the ame, but they were closed without drainage. In each case recovery as rapid and uneventful without any evidence of peritoneal irrita-on or sepsis, the post-operative course being that of a clean, interval ppendectomy.

I am a firm believer in the doctrine, " When in doubt do not drain " n such cases, but all of these were of the type that I should have rained in ordinary circumstances. The smooth convalescence with-ut drainage was very gratifying.

TEN-SECOND STERILIZATION.

By H. E. Harvey, Lieutenant Commander, Dental Corps, United States Navy.

The molten metal sterilizer is to be issued as an item on the new ental supply table, and in connection with it notice might well be ken of the following facts. As current literature will show, this erilizer has been in use for several years and has been tested as to its ctericidal properties by a number of laboratories, among which are e Research Institute of the National Dental Association and the boratories at the Walter Reed General Hospital of the United ates Army.

Ten seconds' immersion in the molten metal seems to be a safe inimum for the sterilization of cotton which has been wrapped with e fingers on broaches, as well as for paper absorbent points and tton pellets.

The molten metal itself is a special alloy made for this sterilizer, and has a melting point of 340° F., and in this connection the metal supplied with the sterilizer should not be confused with the low-fusing metal known as Melottès metal, because the melting point of the latter is approximately 205° F.

The substitution of Melottès metal for the metal supplied with the sterilizer would result in having a molten metal at 205° F. instead of at 340° F., which latter temperature is essential for sterilization in 10 seconds.

The alloy furnished with the sterilizer becomes blue at 430° F., and when a blue tinge is noticed the flame should be lowered or the metal container raised from the flame sufficiently to cause the blue color to disappear. Tests by manufacturers have shown that 500° F. is necessary to take temper out of broaches, so that the range of temperature from 340° F. to 430° F. is within safe limits in this respect.

The immersion of a cold instrument or a large instrument will often result in a portion of the molten metal sticking to the instrument upon removal, and to prevent this it has been found necessary to have a wide-mouth bottle standing near the sterilizer, such as an empty container in which is supplied waxed dental floss, nearly filled with liquid petrolatum, and into this the instruments may be dipped one-fourth inch before immersing in the molten metal.

Should a small amount of metal stick to the instrument upon withdrawal, tap it sharply across the top of the metal bowl; if this fails to remove the metal, dip the instrument into the liquid petrolatum and resterilize, whereupon it will be found that the metal does not adhere to the instrument.

The necessity for the sterilization of cotton and instruments is so frequent that it has been found convenient to start the sterilizer with the first dental appointment and continue it in operation until the office is closed.

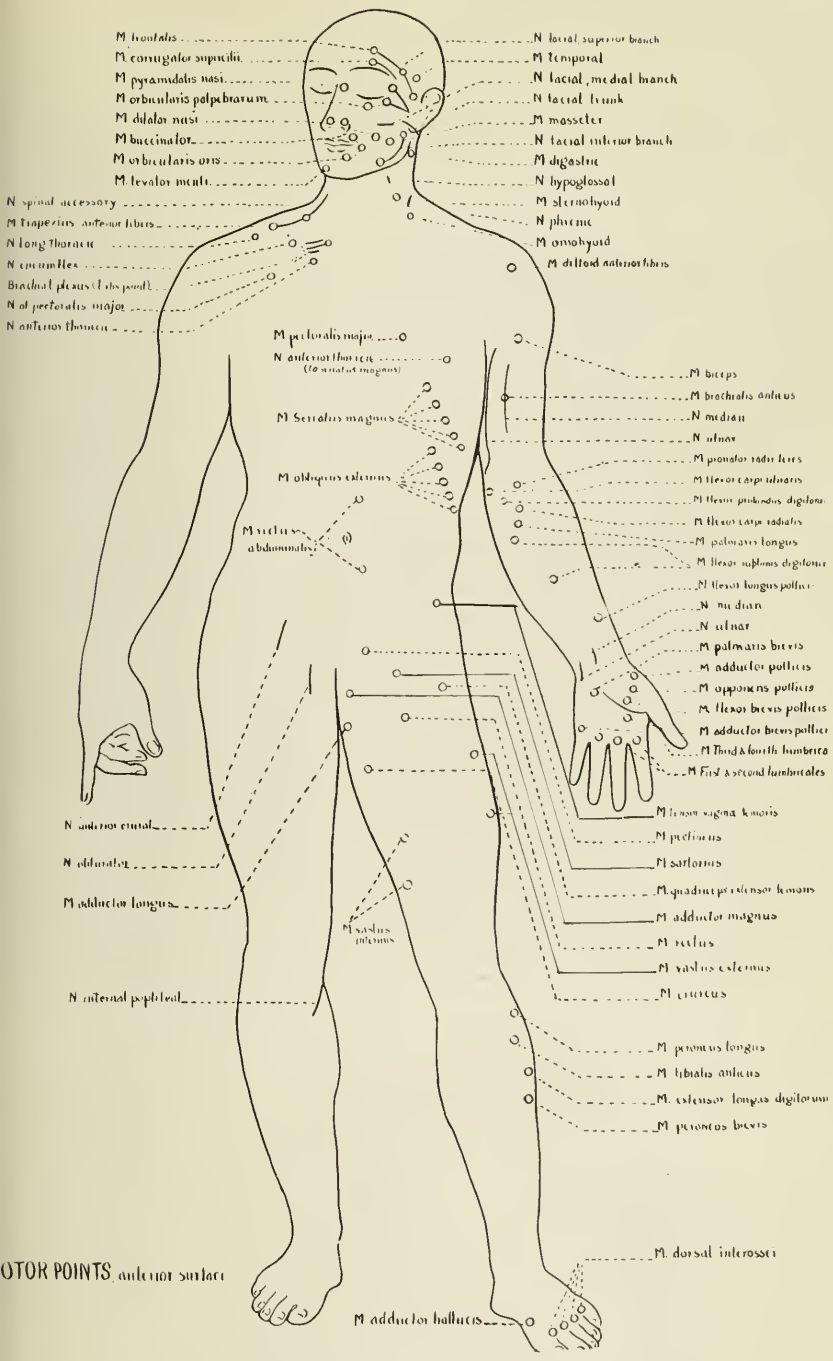
The flame of the lamp under the sterilizer is thus constantly available for the same purposes as the flame of the usual small alcohol lamp for dental operations. When this sterilizer is started the cover of the bottle containing the liquid petrolatum is removed, so that instruments may be sterilized quickly by the use of one hand.

On shipboard it will be necessary to secure the lamp to the working shelf, as it has proven top-heavy on a rolling ship.

THE USE OF MERCUROCHROME–220 IN INFECTED WOUNDS.

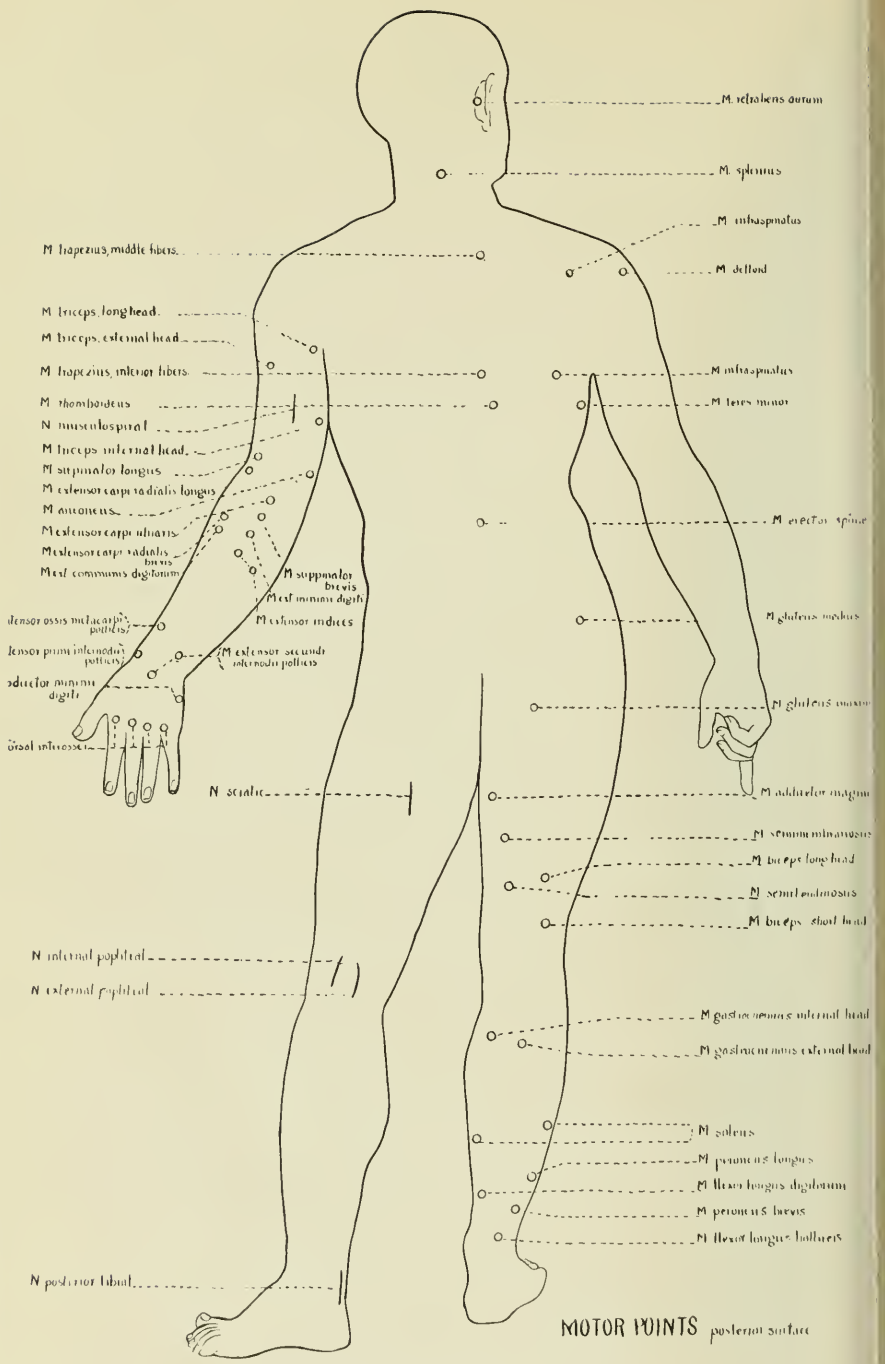
By W. L. Martin, Lieutenant, Medical Corps, United States Navy.

We have used Mercurochrome–220 in infected wounds for nine months, with results which have been very gratifying. A 2 per cent



MOTOR POINTS, anterior surface

MOTOR POINTS ANTERIOR SURFACE.



MOTOR POINTS POSTERIOR SURFACE.

olution seems to be most effective, is not irritating, and, in fact, eems to allay irritation. Sutured wounds are not opened up but re gently irrigated with a 2 per cent solution by inserting a syringe etween sutures. In very virulent infections a Dakin tube is inerted and 5 c. c. or 10 c. c. of the solution instilled every three hours. The worst infections are cleared up in two or three days. Open ounds can be resutured very early and primary union expected. We have found that a 2 per cent solution is most efficacious, frequent rrigation is indicated in the most virulent infections, dry gauze ressings are better than wet dressings, and delayed or secondary uturing results in primary union.

NOTES ON MOTOR POINTS.

By W. S. Bainbridge, Commander, Medical Corps, United States Naval Reserve Force.

At the department of physiotherapy at the United States Naval Hospital, New York, we found it necessary in our work to have motor oint charts; search for available charts on a large scale showed only ne female figure, which of course would not be satisfactory for our urpose. I, therefore, had an artist draw from exact measurements arts of the male figure motor points; anterior and posterior charts ere made and given a place in the muscle-training room. They have roved of great value. Alongside of these charts are charts of the uscles and nerves, as well as the large blood vessels.

The nurses and corpsmen have been aided in their work, the coperation of the patients obtained, and the interest of all largely ineased.

Complete clinical examination of a muscle or nerve, to ascertain ne presence of functional or organic change, must include certain tablished electrical tests. These tests, faradic and galvanic, call for curate knowledge of the course of the supplying nerve and of the ntrance of its nerve twig into the muscle under investigation.

"The motor points are the areas upon the surface of the body at hich the individual nerves and muscles can be most readily excited y electricity. For the nerves these points coincide with those at hich the nerve lies most superficially or where it can be pressed gainst a resisting tissue; for the muscles they lie over the point of ntrance of the nerve into the muscle." (Henry Hun: Analytical and ifferential Diagnosis of Nervous Diseases. Troy, N. Y., 1913, p. 77.)

As an aid to the busy operator in making these tests it is usual to ve at hand large diagrams of the human body, showing the location muscles, nerves, and motor points; these charts are best placed ithin view, for ready reference, near the apparatus employed for e tests.

Another means to complete the diagnosis, in connection with motor-point studies, would be a parallel-column table showing—(1) the nerves, (2) the muscles, (3) the function of the latter.

Such a list may be found in "A Textbook of Nervous Diseases," by Robert Bing, translated by Charles L. Allen, New York, Rebman Co., 1915, pages 14–15.

With this table at hand the operator may the more speedily "understand the motor and sensory symptoms corresponding to lesions in the territories of distribution of definite nerves."

Method of testing: Again quoting Hun (*supra*): "The electrodes should be kept well moistened with warm water during the testing. The larger electrode is placed on sternum or back of neck or sacrum, while the smaller electrode, provided with an attachment for making and breaking (opening and closing) the current, is placed over the motor point of nerve or muscle. The secondary current of a *coarse wire* faradic battery should be employed and the current should be gradually increased in strength, by methods which vary in different batteries, until the faintest contraction of the muscle occurs whenever the current is suddenly closed, the negative electrode being over the motor point. The test should be repeated several times (*gradually using a weaker current as the skin moistens*).

"With the electrodes arranged as above, first the negative, later the positive, electrode of a galvanic battery should be placed over the motor point or nerve or muscle and the strength of the current slowly increased, by means of the rheostat, until the faintest distinct contraction of the muscle occurs whenever the current is closed. The strength of the current causing this contraction, with each electrode in turn over the motor point, should quickly be read from the galvanometer, even before the needle has quite ceased its oscillations. In the same way read from the galvanometer the strength of the weakest current which will cause the faintest distinct contraction when each electrode in turn is on the motor point and the current suddenly opened.

"In all cases both the muscle and the nerve supplying it should be tested both by faradism and galvanism.

"Note the character of the muscular contraction, whether quick or sluggish (degenerative) or showing any peculiarity, and whether it is unusually persistent (myotonic), or whether it rapidly grows feebler under repeated tests (myasthenic)."

A knowledge of the reactions of degeneration, described in any standard work on diagnosis of nervous diseases, and of the newer condenser and progressive tests, details of which are given in recent works on medical electricity, will be found of value in any study of the motor points.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Lieutenant Commander C. W. O. Bunker, Medical Corps, United States Navy.
Lieutenant Edwin Peterson, Medical Corps, United States Navy.

TROPICAL MEDICINE.

PEARCE, L. **Studies on the treatment of human trypanasomiasis with tryparsamide. (The sodium salt of n-phenylglycineamide-p-arsonic acid).** Jour. Exper. Med., December 1, 1921. Supplement No. 1.

The Rockefeller Institute has for years been interested in experimental chemotherapy of certain protozoan infections. In 1915 Jacobs and Heidelberger prepared a synthetic, organic, arsenical compound (n-phenylglycineamide-p-arsonic acid), the sodium salt of which has become known as tryparsamide. This latter preparation was found to have a very favorable biologic behavior and to be very efficient in the treatment of experimental trypanosome infections (*T. brucei*, *T. gambiense*, *T. evansi*, *T. equiperdum*, *and T. equinum*).

The successful biological experiments with tryparsamide caused the Rockefeller Institute to send a mission to the Belgian Congo in May, 1920, to study the effect of the drug on patients suffering with trypanosomiasis (*T. gambiensi*).

Pearce gives, in this paper, a complete account of the mission's findings. The report of this mission, because of the care with which its researches were carried out and the large number of cases treated, deserves consideration as an important adjunct to the study of the treatment of sleeping sickness.

Seventy-seven cases were treated, but the comparatively short time allowed for observation must be considered before arriving at any definite conclusions regarding the efficiency of this preparation. The time factor is of extreme importance in this disease and can be the only criterion of cure.

Certain findings, however, speak well for the efficacy of the treatment. The most important of these is the apparent effect on the cerebrospinal fluid. In the majority of moderately advanced cases the intravenous administration of tryparsamide was followed by marked improvement in the cellular constituents of the cerebrospinal

fluid, indicating that the treatment has definite effect on the meningeal involvement—a question of burning interest at present time.

The one criticism to be made might be the failure to find, except at one time, the organism in the spinal fluid. This is counteracted, however, by the rather complete records of the cytology.

The drug, which is extremely soluble in water, was administered intravenously in the majority of cases, four times intramuscularly, the dose varying from 4.7 to 112 mg. per kilo weight. Sterilization of the peripheral blood was accomplished in all cases within 24 hours after the first dose, often within 5 to 10 hours.

The organism was not found again in the peripheral circulation until 17 to 111 days after the administration of the drug. Three to four weekly doses of 3 to 5 gms. in moderately advanced cases produced decreases of from 57 to 98 per cent in the cells of the cerebrospinal fluid. Repeated courses of treatment in several instances brought the cell count down to normal and were accompanied with marked clinical improvement. (E. P.)

St. John, J. H. **The Wassermann reaction in malaria.** Am. Jour. Trop. Medicine, September, 1921.

St. John presents a group of 101 cases of acute malaria and a group of 15 cases of chronic malaria (autopsies) in which Wassermann reactions had been done. Of the 101 acute cases, 5 instances were found (4.9 per cent) in which malaria was the apparent cause of the positive reaction (+ +), the latter becoming negative during convalescence. Three one-plus and 5 anticomplimentary reactions also became negative during convalescence.

In the 15 autopsies the Wassermann reactions were consistent with the pathological findings. St. John believes it reasonable to assume that certain malarial serums possess an increased degree of anticomplimentary tendency, and that this at times may not be sufficient to manifest itself in the serum control, but when combined with the natural anticomplimentary factor of antigens becomes capable of causing double-plus readings. (E. P.)

Levy, M. D. **The Wassermann reaction in malarial fevers.** Am. Jour. Trop. Med., September, 1921.

Amongst some 200 cases of malaria treated in the John Sealy Hospital, Galveston, Tex., during the past four years, the author found that Wassermann reaction had been done in 50 cases. Of these, positive Wassermann reactions were found in 17 cases, 13 of which gave a frank history of syphilis; of the other 4, 1 gave history of Neisserian infection, 1 gave a negative Wassermann after treatment

ith mercury salicylate, and in 1 the Wassermann persisted during ie afebrile period. The author feels that these 4 cases are without uestion luetic. Of the 31 negative cases, the blood for the test was btained during a marked febrile reaction in 27 cases and 4 during febrile periods. Levy believes that a luetic infection must be pres-nt before a positive Wassermann reaction can be obtained in a case f malaria. (E. P.)

ENNISON, G. **Rat repression by sexual selection.** Jl. Roy. Sanitary Inst., May, 1921. From Sant. Supplement of Trop. Dis. Bull., October 30, 1921.

Extermination of rats is a subject of extreme importance and may t times present itself in the form of a concrete problem to the naval iedical officer. The following excerpts are considered to be of iough interest to be quoted:

"For a hundred and fifty years [the methods advised for rat xtermination] 'have been followed with all the ardour of a neces-ıry duty, and with a sustained interest in a cheap and popular ort, yet the rat survives in undiminished numbers and swarms hen vigilance is in the least relaxed. Why? There are two rea-ons: Man's protection and the rat's fecundity.

"'The first is unavoidable; our houses must always be a sure efense against the wild creatures that take their toll of decumanus the open country.

"'We must attack the second.

"'It is evident that the rat is hindered by far other causes than ian. Limitation of food is the chief. The other primary cause is ie struggle amongst the rats themselves, and particularly the harry-ig of the breeding does. It is precisely on these two points that ur present system of destruction helps the rat in the struggle for xistence. The more rats killed, the more food for the remainder; ie more males killed, the greater the chance for the doe to breed uietly and raise her offspring. These two facts together neutralize ll the good effects of indiscriminate slaughter. The rats can be educed quickly to a certain point, beyond which it is almost im-ossible to make further progress, and from which they soon reach ieir former numbers if at all neglected; for example, in Copen-agen rat catchers caught 100,000 in four months, August 8 to De-ember 8, 1904; they could still catch 99,000 in the three months of uly quarter, 1908, under the new rat law.

"'The low level seems to be that point at which the rat can get ood without risk; further, if it be true, as is often stated, and is, think, proved by the great increase in females captured during ie famine occasioned by the war, that male rats are more courageous ian females, the indiscriminate slaughter is actually harmful, for

the bold, roving male is caught out of proportion to his numbers, and the race tends to grow more and more polygamous, following a law of nature, which is understood and followed by breeders of domestic animals, and I have reason to believe is fully appreciated by rat and rabbit catchers who look to a supply of rodents to keep them in work. The wild ram has, perhaps, six ewes; the domesticated, forty. The domesticated stallion covers far more than the wild horse, and the barnyard cock has thrice the harem of the jungle fowl.

"'All breeders of pheasants for shooting know the risk from too many males, and habitually kill off many cock birds before mating time. A herd of guinea pigs or flock of budgerigars, if left to itself, will finally become all male.'

"The author supports his contention by two examples, the bird of paradise, whose males have been hunted throughout all time and yet survives, and the passenger pigeon, now extinct, where the females were killed. 'Man upset the balances of the sexes, and the ardor of the male pigeon completed the disaster.'

"The author determined to put into practice the Rodier system, in which females only are killed."

Jennison applied the Rodier system at Belle Vue, and in comparing the results obtained there with those obtained in Copenhagen, where the destruction method for rat repression has been enforced, he finds that Belle Vue has reduced its rats gradually one-half in under 5 years while Copenhagen reduced them only one-third during 12 years.

"'The best plan for rat destruction appears to me plain. Where rats are very numerous, apply 12 months of intense slaughter, which will bring the problem within manageable limits; then apply the Rodier system. Its great merit is the lengthy period of neglect that an area well in hand can sustain before becoming, if it ever does become again, a nuisance; its defect is solely the difficulty of execution. Rat poisoning must cease and rat killing as a sport must be banned, though a careful man may shoot with safety rats carrying food, as the does alone perform this duty.

"'Spring traps must not be used.

"'The rats must be taken alive. This can be done. In the city of Tokyo, 97 per cent are so captured.

"'The best wire trap is one at least 8 inches high and open at both ends. The eel trap pattern also gives good results. In the excellent series of articles in *The Field*, a note of many others will be found.

"'For catching rats *en masse*, the room or area trap is superior to all others.

"'The trap may be any shape, but should be large. A frequented room is very suitable, or an inclosed area in a yard—the boards of

this last must be 3 feet high, tin lined, and with an overhang. The entrance should be 4 or 6 feet wide, closed by a drop slide worked by a string and pulley.

("'N. B.—I now find this width is not necessary—my catcher has only used an opening 6 inches wide, 2 inches high, for many years.'")

"'The trap should be kept baited and the slide in position; the rats will grow accustomed to it and can be trapped about once a fortnight without growing afraid. When the trap is dropped, the supporting string should be cut, not untied, as the rats are quick in retreat and easily alarmed by any noise. A small pipe, 4 inches in diameter, should be at some convenient corner, provided with a cover to prevent egress. When the trap is dropped and the cover removed, the rats can be driven quickly through the pipe into a bag tied round the outer end. From the bag they can easily be taken by an experienced man, examined, and the females destroyed.'" (E. P.)

ARCHIBALD, R. G. **Notes on a case of tubercular leprosy treated by intravenous injections of stibenyl.** J. Trop. M. London, November 1, 1921.

Archibald reports the case of a patient with advanced tubercular leprosy who improved rapidly under treatment with stibenyl, the sodium salt of p-acetylaminophenylstibinic acid. The drug was given intravenously on alternate days in 1 per cent solution. The dosage employed being 0.1 grm., 0.15 grm., 0.2 grm., 0.4 grm., 0.5 grm., and 0.6 grm. A rest from treatment for 14 days was given between each course. (E. P.)

CONNOR, R. C. **The combined bismuth-emetine treatment for amebic dysentery and amebiasis.** Proc. Med. Asso. Isthmian Canal Zone, July to December, 1918.

The author has treated over 100 cases by this method with, so far as he can learn, only one relapse. The treatment is essentially as follows: The patient is put to bed and proper steps are taken to prevent the spread of infection. A strict milk diet is instituted. Two ounces of castor oil are given as a preliminary purgative. A heaping teaspoonful of bismuth subnitrate, well mixed with 4 to 6 ounces of water is given four to six times a day until the bowel movements are reduced to four or six in number. The bismuth is now given every 4 hours until the patient has passed 24 to 48 hours without a stool. One ounce of castor oil is then given. In severe cases the bismuth treatment is continued for 2 weeks after discharge from hospital. Emetine is usually given in four treatments 3 to 5 days apart in severe cases and three treatments 4 to 5 days apart in mild cases, the dose varying from one-third to 1 grain. The average amount of emetine given any one patient during the course of treatment was 8 to 10 grains. (E. P.)

HANSON, H. **A Review of the malaria incidence on the Canal Zone. (Period of 1904 to 1918, inclusive.)** Proc. Med. Asso. Isthmian Canal Zone, January to December, 1919.

Hanson, who is assistant chief health officer of the Panama Canal, states he has often heard it said during the past year that there seems to be an unusual amount of malaria on the Isthmus and the Canal Zone. He shows, however, how the rate within the regular sanitated areas is progressively decreasing, which demonstrates the value of what is designated in the Canal Zone as permanent work, viz, the subsurface tile drains, lining of permanent ditches with concrete, and the filling of low, swamp areas. The author emphasizes the importance of constant, keen, intelligent supervision of the sanitary forces of the health department in order that the potential menace may be kept under control. (E. P.)

ALBERT, J. **The experiment of leper segregation in the Philippines.** Jour. Philippine Is. Med. Asso., July–August, 1921.

Albert gives a very long array of facts and figures in order to show that the present method of handling the leper situation in the islands is unjustified and not in accord with the modern knowledge of leprosy and its control. To him, the conception of the Culion Leper Colony, together with the law requiring absolute and compulsory segregation of all lepers of the islands being a phenomenal success is fallacious if considered in the light of the statistics and figures of that leprosarium. The latter seem to show that the "experiment" has been a distinct failure. The author compares the drastic method of isolation as practiced in the Philippine Islands with the method of modified isolation in Norway and shows what brilliant results were obtained in the latter country in contradistinction to the poor results obtained in the islands.

The author makes a strong appeal for modification of the present law of compulsory segregation of all lepers in order to get better results and not to work too many hardships on the afflicted patient and his family. (E. P.)

BOYD, W. **The detection of Lamblia (Giardia) intestinalis by means of the duodenal tube.** Canad. M. A. J., September, 1921.

The author gives a short review of the literature on Lamblia intestinalis and reports one case of peculiar interest. A patient with typhoid fever was admitted to the hospital. The disease ran a regular course. In order to determine whether or not he was a carrier, a duodenal tube was passed and by means of Lyon's magnesium sulphate method the contents of the gall bladder and duodenum were obtained. The centrifuged deposit was examined under low power.

"The picture which met one's eye was remarkable in the extreme. The macroscopic field was swarming with animalcules in the highest

state of animation." Stained slides showed the presence of Lamblia intestinalis.

On the following day the duodenal tube was passed again, but only fragments of the parasite could be observed. The author suggests that they probably had been killed by the osmotic power of the magnesium sulphate solution.

A subsequent examination months later failed to reveal any protozoon.

The author suggests the duodenal tube for diagnosing the condition and a strong solution of magnesium sulphate for treatment. (E. P.)

LOGAN, A. H. **Balantidium coli and pernicious anemia: Report of Four Cases.** Am. Jour. Med. Sc., November, 1921.

The author gives a short review of the literature and describes the two forms of the disease, the acute and chronic. The prognosis of the acute type is very bad; in the chronic type of the disease it seems to be bad only when the syndrome of pernicious anemia is added. It seems probable to the author that the hemolytic agent found by Glaessner in *Balantidium coli* is the cause of the pernicious anemia syndrome in the chronic case. Due to the extreme difficulty of eradicating these parasites, the condition of anemia is persistent. Iron and arsenic were given for the anemia and thymol and chenopodium as vermifuge. In one case the author used arsphenamin with apparently very good effect.

Four cases of Balantidium coli infection are reported that were treated at the Mayo clinic. The cases gave a positive history of chronic dysenteric symptoms for several years past and showed during the period of observation progressive findings of pernicious anemia. Two of the cases died from the latter cause.

The author calls attention to the family histories of three of the patients; one or more members of the same household living under similar conditions and eating the same food had died from pernicious anemia or anemia. (E. P.)

APPEL, F. **Tropical myositis.** Arch. f. Schiffs. u. Tropen-Hyg., July, 1921.

The author describes a series of cases of muscular involvement to which he gives the name "tropical myositis." The acute case may follow some injury and is characterized by sudden onset, with more or less high fever and muscular pains. The patient may be very sick, and albumin is often present in the urine. The deep muscular pains and palpable inflammatory muscle masses are characteristic. One or several abscesses may develop in various muscles, simultaneously or one following the other. The muscles of the gluteal,

thigh, and pectoral regions are most commonly involved. The fever, as a rule, becomes normal within a few days, but may last for weeks. A chronic state with cachexia may develop. The exciting factor is not known; filariasis, sporotrichosis, and pyogenic bacteria have all been incriminated as possible etiological factors. The author found pyogenic bacteria in several of his cases, and states that the condition should be differentiated from filariasis, sporotrichosis, gumma, and acute fevers. (E. P.)

Craig, C. F. **THE DIFFERENTIAL DIAGNOSIS OF THE COMMON INTESTINAL AMŒBÆ OF MAN.** Mill. Surgeon, November, 1921.

The author emphasizes the extreme importance of examining freshly passed faces when looking for amœbæ, due to the degenerative changes that amœbæ undergo soon after passage. In discussing the preparation of stained specimens, the author gives two methods, the iodine and hematoxylin method.

Iodine method.—Especially useful in the cystic stage of the amœba. Solution employed: A 1 per cent watery solution of potassium iodide saturated with iodine.

Staining.—Usual method; allow preparation to stand for 10 minutes before examined. The nuclei are distinctly visible.

Hematoxylin method.—Make the smear on a cover glass. Place with film side downward in fixing solution, which is made up as follows: Saturated solution of bichloride of mercury in water, 2 parts; absolute or 96 per cent alcohol, 1 part; mix and add to each 100 c. c. of the mixture, 5 c. c. of glacial acetic acid. Fix for 10 to 20 minutes. Cysts should be allowed full time.

Wash in 50 per cent alcohol.

Wash in 70 per cent alcohol.

Wash in 70 per cent alcohol to which a few drops of the iodine solution already described have been added. Keep in this mixture for 30 minutes. Then place in 35 per cent alcohol for a few minutes. Stain for 10 to 20 minutes in the following solution:

Hematoxylin, 1 gm.

Distilled water, 1,000 c. c. Dissolve and add:

Sodium iodate, 0.2 gm.

Alum (potash), 50 gm. (Cysts should be allowed the full 20 minutes.)

Wash in tap water until blue.

Dehydrate by carrying through the various alcohols, 35 per cent to absolute, equal parts of absolute alcohol and xylol, pure xylol (5 to 10 minutes in each solution).

Mount in balsam.

N. B.—The preparation should not be allowed to dry at any stage of the fixing, staining, or dehydration process.

DIAGNOSTIC POINTS IN THE DIFFERENTIATION OF ENDAMŒBA HISTOLYTICA, ENDAMŒBA COLI AND ENDAMŒBA NANA.

VEGETATIVE STAGE OF DEVELOPMENT, LIVING SPECIMENS.

	Endamœba histolytica.	Endamœba coli.	Endamœba nana.
Size.....	18 to 80 microns; average 20 to 35 microns.	15 to 50 microns; 20 to 30 microns.	6 to 12 microns; 8 microns.
Motility....	Very active and progressive.	Sluggish; rarely progressive.	Sluggish; not progressive.
Cytoplasm ..	Ectoplasm and endoplasm well differentiated in active organisms.	Ectoplasm and endoplasm very poorly differentiated.	Ectoplasm and endoplasm poorly differferentiated.
Pseudopodia	Large, finger-shaped, clear and glasslike in appearance.	Shorter and blunt; not glasslike in appearance.	Broad and blunt; not glasslike.
Vacuoles....	Not present in most fresh living specimens.	Endoplasm filled with vacuoles.	Endoplasm filled with vacuoles.
Inclusions...	Red blood corpuscles; no bacteria, crystals or other material.	Numerous bacteria crystals and other material; no red blood cells.	Numerous bacteria; no red blood cells.
Nucleus....	Generally invisible...	Visible.....	Generally invisible.

VEGETATIVE STAGE OF DEVELOPMENT, STAINED SPECIMENS.

Structure of nucleus.	Endamœba histolytica.	Endamœba coli.	Endamœba nana.
Nuclear membrane.	Delicate; inner surface lined with single layer of minute chromatin grains.	Thicker; inner surface lined with coarser chromatin grains.	Intermediate in thickness; chromatin grains rarely observed on inner surface.
Karyosome..	Very minute; situated in center of nucleus.	About twice as large as in *histolytica;* situated eccentrically.	Large and usually divided into one large and one or more small portions connected by a delicate thread.
Intranuclear chromatin.	No chromatin between karyosome and nuclear membrane.	Chromatin grains between karyosome and nuclear membrane.	No chromatin between karyosome and nuclear membrance.
Cytoplasm ..	Not vacuolated.....	Much vacuolated.....	Many vacuoles.
Inclusions ..	Red blood corpuscles; no bacteria or crystals.	No red blood corpuscles; bacteria, crystals, and other material.	Many bacteria.

CYSTIC STAGE OF DEVELOPMENT, UNSTAINED SPECIMENS.

Size.....	6 to 20 microns; average 7 to 15 microns.	10 to 22 microns; average 12 to 18 microns.	8 to 12 microns long by 7 to 10 microns broad.
Shape.....	Generally spherical; rarely irregular or oval.	Spherical; rarely irregular or oval.	Oval or ellipsoidal; sometimes spherical.

DIAGNOSTIC POINTS IN THE DIFFERENTIATION OF ENDAMŒBA HISTOLYTICA, ENDAMŒBA COLI AND ENDAMŒBA NANA—Continued.

CYSTIC STAGE OF DEVELOPMENT, STAINED SPECIMENS.

Structure of nucleus.	Endamœba histolytica.	Endamœba coli.	Endamœba nana.
Nuclei, number.	1 to 4.....	1 to 8; sometimes more, up to 24.	1 to 4.
Nuclei, structure.	Like vegetative form but smaller; delicate membrane, minute central karyosome, no chromatin between membrane and karyosome except the minute grains on membrane.	Like vegetative form but smaller; thicker membrane with larger grains of chromatin, larger karyosome eccentrically placed and chromatin grains between karyosome and membrane.	Like vegetative form but smaller; thick nuclear membrane, large divided karyosome and no chromatin between the karyosome and membrane.
Chromidial bodies.	Bar, oval or rodlike masses with rounded ends; present in about 50 per cent of cysts.	Filamentous or spicular with square or pointed ends; present in less than 10 per cent of the cysts.	None present comparable with those of *histolytica* or *coli;* small granular or rodlike masses are rarely observed.

(E. P.)

Wesenberg-Lund, C. **Contributions to the biology of the Danish culicidæ.** Mém. Acad. R. Sciences et Lettres Danemark. Vol. 7, No. 1, pp. 1–210. (From Tropical Diseases Bulletin, October, 1921).

"Why has malaria, which up to three generations ago was common in Denmark, now disappeared, though in every farmstead *Anopheles maculipennis* is still abundant? The author considers this question at great length and comes to the conclusion that, whatever may be the influence of contributory factors, the main causation is the change in the character of Danish farming. In the old days of arable crops and open pastures it would frequently happen that man was a more easily procurable prey than cattle for *Anopheles maculipennis.* But in the modern system of cooperative dairy farming the domestic animals are concentrated in good permanent shelters where the insect can and does concentrate on them. Man, therefore, who is only a *pis aller* for *A. maculipennis*, escapes attack; and thus the malaria chain has been broken by a change of circumstances, highly agreeable to the insect's tastes, which have brought about a change in the insect's habits." (E. P.)

Yorke, W. **Recent work on the treatment of sleeping sickness: A critical review.** Trop. Dis. Bull., October 15, 1921.

The author gives an exhaustive review of recent developments in the treatment of trypanosomiasis. This critical study is called forth

by the claims of Marshall and Vassallo to have discovered a new method of treatment of human trypanosomiasis that gives results "better than any hitherto obtained by repeated intravenous or subcutaneous injections of salvarsan, atoxyl, antimony, or other preparations." The author calls attention to the general interest aroused by these claims, particularly that of the colonial office, who, it seems, has already approved of proposals to send a special mission under direction of Marshall and Vassallo at an outlay of 50,000 pounds to investigate the serum treatment of trypanosomiasis in man and animals.

The two "fundamental assumptions" on which the work of Marshall and Vassallo is based are:

"1. Although the administration of one dose of salvarsan, neosalvarsan, or atoxyl is sufficient to sterilize the blood stream, symptoms reappear within a variable period, averaging about four months, and the disease progresses to a fatal termination.

"2. This is because quite early in the disease the trypanosomes appear to gain an impregnable position in the central nervous system; in this position they are protected from the action of drugs and from it they are later able to infect the blood stream again."

The treatment as devised by Marshall and Vassallo and based on these hypotheses is as follows:

"An intravenous injection of neo-kharsivan 0.6 gm. is given and three hours later 2 oz. of blood are withdrawn and allowed to clot for 20 hours; a volume, varying from 20 mm. to 2 c. c. or more, of the serum separated from this blood is then injected intrathecally, after the withdrawal of a corresponding volume of cerebrospinal fluid."

Yorke goes over the literature quite thoroughly and in summarizing his findings states that "there appears no reason to doubt that blood stream may be reinfected from the cerebrospinal fluid, if the latter is already invaded, and that this may, in part at least, explain the relapses which occur after treatment in advanced cases; such a mechanism can not, however, explain the post-treatment reappearance of trypanosomes in the blood of earlier cases where there is no reason for believing that the nervous system is involved; in these cases the blood stream, provided it is really sterilized by the drug administered, must be reinfected from circulation backwashes, or from tissue spaces, where the parasites have been able to exist protected from the medicant circulating in the blood."

With regard to the priority claims of Marshall and Vassallo to his "new" method of treatment, Yorke calls attention to the work of Reichenow (1914) on intrathecal therapy of sleeping sickness. The latter "subjected a number of cases in the second stage of the disease to the following procedure:

"Two or three hours after an intravenous injection of neosalvarsan, an amount of blood sufficient to produce about 10 c. c. of serum was withdrawn; after coagulation, the serum was removed from the clot, mixed with a little water containing 0.04 gm. of neosalvarsan and injected into the spinal canal, at least 10 c. c. of cerebrospinal fluid having been previously withdrawn.

"It will be seen that this procedure is substantially the same as that recommended by Marshall and Vassallo, the only difference being that Reichenow adds 0.04 gm. of neosalvarsan to the serum before injection. In a later paper Reichenow gives the results of these experiments; he states that after the intrathecal injections a decrease or even total disappearance, of the trypanosomes in the cerebrospinal fluid was observed, *but that the parasites always returned*—a fact which the author explains by the assumption that the medicant had not diffused all through the liquor cerebralis, and more especially had not penetrated into the ventricles of the brain."

Yorke presents four large tables summarizing the actual work done in this field and results obtained. Table 1 gives records of cases in which trypanosomiasis disappeared from the cerebrospinal fluid after treatment, and also of cases who lived for prolonged periods after their cerebrospinal fluid was found to be infected. Table 2 shows the fate, after more or less prolonged periods, of various groups of sleeping sickness cases which remained untreated. Table 3 shows the fate, after more or less prolonged periods, of various groups of sleeping sickness cases which had received only one or several injections of some arsenic or antimony compound. Table 4 shows the fate, after more or less prolonged periods, of various groups of sleeping sickness cases which had received more or less prolonged courses of treatment.

From these tables the author concludes that a certain number of cases showing trypanosomiasis in the cerebrospinal fluid may, in the absence of intrathecal treatment, present at subsequent times a sterile spinal fluid and even recovery; further, that there is a possibility of spontaneous recovery or at least enjoyment of health for three to eight years after the disease has been diagnosed.

Yorke concludes his critical review of Marshall and Vassallo's papers, as follows:

"(1) The work is based on two fundamental assumptions, both of which are incorrect, or at least can only be accepted with very considerable qualification.

"(2) The treatment is not new, even for trypanosomiasis, but is substantially the same as that tried by Reichenow in 1914, and abandoned by him as useless in that it failed to sterilize the cerebrospinal fluid.

"(3) Marshall and Vassallo produce no satisfactory evidence that intrathecal injections of salvarsanized serum sterilize infected cerebrospinal fluids.

"(4) The results, so far published, fail to substantiate the claim that the treatment gives better results than any hitherto obtained by other methods." (E. P.)

Cawston, F. G. **A series of cases of bilharzia disease treated with tartar emetic.** Jour. Trop. Med., October 15, 1921.

The author reports 25 cases of infection with S. hæmatobium in which the bilharzia parasites would appear to have been eradicated by tartar emetic. He emphasizes the importance of dissolving the powder in boiling water just before use. The injections should be given at least three times a week for a complete month. A total of 12 grams seem to be able to effect cure. (E. P.)

Cabrera, C., and Wade, H. W. **On the iso-agglutination group percentages of Filipino bloods.** Jour. Philippine Islands Med. Soc., May–June, 1920.

The authors examined bloods from 204 Filipinos and found that the relative percentage of the various groups varied markedly as compared with the results obtained for Chinese and Americans. Moss classification used.

Races	Filipino.	Chinese.	American.	
Investigators	Cabrera and Wade.	Liu and Wang.	Moffit, etc.	Moss.
Cases	204	1,000	1,122	100
	Per cent.	Per cent.	Per cent.	Per cent.
Group I	1	10	4.8	10
Group II	14.7	25.1	53.6	40
Group III	19.6	34.2	6.2	7
Group IV	64.7	30.7	35.4	43

(E. P.)

Jackson, T. W. **Public health in the Dominican Republic.** Am. Jour. Trop. Med., November, 1921.

The author, who until recently has been director of the National Laboratories of the Dominican Republic, criticizes the program at-

tempted by the department of sanitation and beneficence of the military government as being too vast in its scope and showing some lack of sense of perspective and proportion. At the same time, he laments the fact that the national laboratory had to be discontinued, this as a result of lesser appropriation for the department.

The proper point of view needed in judging pioneer work of the kind attempted in the Dominican Republic may be obtained by reading the article by Commander R. H. Hayden, Medical Corps, U. S. N., quoted in extenso in this number. The shortcomings of the department are realized and the hard work necessary in order to educate the people to live up to the spirit of the code is appreciated.

Jackson states that "the ability to put across completely and adequately an elaborate sanitary program in any country depends upon one of two conditions. Either there must be unlimited and unquestioned authority, backed by governmental aid, military and fiscal, or there must be a highly developed public-health conscience, such as we have in some but by no means all of our American communities."

"In the last analysis all of our successful governmental experiments—so far as they have actually succeeded—have been by reason of the first-named condition. Witness the Philippines and Panama. As this condition of authority, governmental support, and adequate financial backing relaxes, the structure weakens and falls into a state of greater or less inefficiency and ineffectiveness."

In the above paragraphs Jackson unconsciously pledges his support to a strong military government with good financial backing as the only solution of the sanitary problem in the Dominican Republic, because it must be conceded that the public-health conscience of Santo Domingo is far below that accepted as safe for a civilized country.

The scope of the sanitary program attempted, if properly backed, depends for its successful solution on the head of the department, inspiring his fellow workers with enthusiasm for their work and with confidence of getting there, no question how difficult it is to reach the goal set. (E. P.)

PHYSIOLOGICAL CHEMISTRY.[1]

EIJKMAN, C. **The metabolism of the man of the Tropics.** Jour. Physiol. Path. Gen., 1921, XIX.

Eijkman calls attention to his studies on the respiratory exchange of tropical men, the results of which he claims fail to show any differences in the basal metabolism of persons living in tropical climates as compared with those living in the temperate zones. (C. W. O. B.)

GUDERNATSCH, J. F., AND BAGG, H. J. **Disturbances in the development of mammalian embryos caused by radium emanation.** Proc. Soc. Exper. Biol. & Med., 1920, XVII, 183.

The injection, subcutaneously or intravenously, of radium emanation into pregnant rats produced hemorrhagic areas in the uteri and ovaries. Some embryos were killed in the uterus and remained attached to the uterine wall and were gradually absorbed. In other cases the fetuses were not killed, but peculiar microscopic lesions appeared in their skin vessels, producing hemorrhagic areas along the dorsal mid line, or in some cases over the entire body with the exception of the ventral surface. In some instances when the fetuses were carried to full term hemorrhagic areas were noted at birth or these areas appeared in several days after birth. (C. W. O. B.)

NASH, T. P., JR., AND BENEDICT, S. R. **The ammonia content of the blood, and its bearing on the mechanism of acid neutralization in the animal organism.** Jour. Biol. Chem., 1921, XLVIII.

From experiments upon dogs "we are led to the conclusion that the kidneys themselves must produce the urinary ammonia. That the kidneys may perform an active synthetic function is not a new idea, but so far as we know the production of ammonia has not hitherto been ascribed to the kidney.

"The blood from the renal vein averages twice as much ammonia as does the blood from the other sources. These differences are so marked as to admit of only one interpretation, viz., that the kidney, instead of excreting ammonia from the blood, forms the ammonia

[1]Acknowledgment is tendered to "Chemical Abstracts" for much of the material in this section.

which it excretes, while at the same time it contributes a small amount of ammonia to the blood.

"If we accept the view that ammonia formation takes place in the kidney as part of its excretory function, it would seem that certain facts in regard to acidosis may be more readily understood. Under the commonly accepted view that neutralization of acids by ammonia is a function of the organism in general, or of the liver, it would seem very difficult to understand such acidosis (depletion of the alkali reserve) as frequently occurs in nephritis, where there is no marked increase in acid production. Even the increase in acid phosphate in the blood reported in some of these cases affords no explanation of depletion of the alkali reserve, since ammonia should be available for neutralization of any circulating acid.

"If, however, we look upon the kidney as the seat of ammonia production, depletion of the alkali reserve becomes readily understandable under certain definite conditions. If ammonia is not available within the organism, the acids must be transported wholly in combination with the fixed bases, or with protein. A depletion of the alkali reserve of the blood could therefore arise under any one of three definite conditions:

"1. Introduction of acid radicles into the blood stream more rapidly than the normal kidney can eliminate them, or can make ammonia to combine with them while eliminating them.

"2. If the kidney becomes defective in its power to eliminate acid radicles, and thus to maintain them at a minimal level in the blood, a depletion of the alkali reserve would result, since the acid radicles would remain in the circulation in abnormal amounts, and would have to be neutralized by the fixed bases or proteins. This condition might well result with a kidney still normal in its power of ammonia production. Such ammonia is available for the needs of the organism only as acid radicles are excreted.

"3. A depletion of the alkali reserve of the blood would result should the kidney become defective in its power of ammonia formation. Even should such a kidney remain normal in its power of excreting acid radicles, the organism would lose base excessively during the excretion of the acid.

"It would appear that the first of these three forms of acidosis occurs, if at all, in diabetes. Very probably either or both of the two latter forms occur in nephritis. It seems from our results that acidosis in the sense of a depletion of the alkali reserve is primarily a kidney disease.

"Although Wakeman and Dakin came to the conclusion that the formation of urea in the animal body is an irreversible process, we

believe that urea is the most probable precursor of ammonia in the kidneys. It has been frequently demonstrated that the urinary ammonia is increased at the expense of the urea, and unless we assume a conversion of urea into ammonia by the kidneys we should have to assume the transportation in the blood of some intermediate product between urea and ammonia, or of some 'complex ammonia compound.' Our work has rendered either of these views very improbable. It is, of course, also possible that the kidney is active in dissemination of amino acids, and that excreted ammonia is supplied from this source." (C. W. O. B.)

NOTES AND COMMENTS.

The following review of investigations carried out recently relative to dispersion of flies by flight has been prepared by Maj. A. N. Tasker, Medical Corps, U. S. Army, and is published for the information of medical officers generally:

"It has long been recognized by sanitarians that a greater knowledge of the methods by which disease-bearing or otherwise injurious flies are disseminated and of the limits of such dissemination would be of extreme value in the application of measures designed to prevent the incidence and development of epidemics of diseases transmitted by these means, but only within the last few years has any detailed effort been applied to the problem of securing this particular epidemiological information. Although some experiments had been previously carried out, it was not until a series of investigations made by Bishopp and Laake, of the Bureau of Entomology, United States Department of Agriculture, in 1916, that any definite proof was had that flies ever traveled by natural dispersion more than a comparatively short distance (1 or 2 miles) from the place of original egg deposit during the course of their adult life.

Briefly, the course of procedure employed in their studies by the entomologists above named was to catch several thousand flies in a trap, mark them so that they might be distinguished, liberate them, and later identify them by their markings after they had been caught in other traps placed at varying distances from the point of liberation. Although several different species were used in these experiments, a very large majority of the individuals were either *Musca domestica*, *Chrysomya macellaria*, or *Phormia regina*. Including a preliminary experiment, five separate tests were performed in Texas in the summer of 1916. The total number of marked flies used during the course of the whole investigation was estimated at 234,000. Large conical flytraps were baited with "gut slime," a packing-house by-product. When a sufficient number of flies had been trapped, a screen cylinder was placed above the flytrap; the cover of the trap was removed and the flies were disturbed so that they would pass up into the cylinder. When several thousand had thus made their way out of the trap the lower end of the cylinder was closed by a piece of cheesecloth and the cylinder with its con-

tained flies was placed in a canvas bag. The flies were at once taken to the point of liberation previously determined upon, and at this point finely powdered red chalk or paint pigment (an ounce or two) was introduced into the cage, which was then inverted several times. The top of the cage was next removed and the flies allowed to escape. Upon emerging from the cage the flies were all seen to be distinctly covered with the coloring agent employed—majority of them being brilliant red. In every experiment there was a considerable mortality among the flies that had been lured into the cages, but Bishopp and Laake express the opinion that this was due more to the heat to which the insects were exposed during the time of transportation from the point of capture to the point of liberation than to any injurious effects of the coloring matter used. That several marked specimens were recovered as long as 17 days after liberation still showing the presence of the coloring agent on their bodies would seem to indicate that this could not have been essentially deleterious in its effect upon the flies.

In order to determine the distance of dispersion, several conical traps 18 inches in diameter and baited with the same "gut slime" were distributed at varying distances from the point of liberation about the countryside. The flies caught in these recovery traps were killed at intervals of 24 hours and the masses of insects therein were carefully gone over for marked specimens. In a great majority of instances such specimens could be identified with the naked eye, but in cases of doubt the individual was subjected to examination with a microscope. It was found that for the first few days after liberation most of the flies remained intensely colored, but as time passed the insects managed to rid themselves of the pigment until at the end of several days little or none could be found except upon the halteres.

Bishopp and Laake summarize the results of their experiments and the conclusions which they draw from them in the Journal of Agricultural Research for August, 1921.

(1) In the territory over which these experiments were conducted both urban and rural conditions were encountered. Under conditions of both kinds there was proof that flies have marked powers of migration.

(2) The maximum distance of spread from the point of liberation for *Musca domestica* was found to be of 13.14 miles; for *Chrysomya macellaria*, 15.1 miles; and for *Phormia regina* 10.9 miles. While other species were included among the flies liberated, the individuals belonging to them were too few in number to give any reliable data as to their dissemination tendencies.

(3) *Chrysomya macellaria* evinces a stronger migratory instinct than does *Musca domestica*. *Phormia regina* showed itself equal to

Chrysomya macellaria from this point of view in one test which offered optimum climatic conditions for the species.

(4) Among the stimuli which induced dispersion, the desire for food and to find a place in which eggs might be deposited appear to be among the strongest; but, on the other hand, the fact that in many instances individuals of the three species mentioned above were found to have passed by not only farmhouses but even towns and cities which would furnish highly favorable facilities both for feeding and breeding indicates that these insects are not influenced by these factors alone, but are, in addition, characterized by a real migratory tendency.

(5) The exact influence exerted by currents of air upon the direction and amount of dispersion could not be determined with accuracy during the course of these experiments because of the "choppy" wind conditions experienced. No more can be said than that there seems to be a tendency for flies to travel with the wind in somewhat increased numbers. They have, however, been shown to travel against the wind and at right angles with it. The investigators conclude, therefore, that the influence of moderate winds on insect dissemination is not of prime importance.

(6) Sex is not a dominant factor in the matter of fly dissemination. Males, as well as females, of the three species named may travel many miles, but there does seem to be some tendency for females in greater numbers to travel far than is the case with males.

(7) The maximum length of life of marked specimens after the day of liberation as indicated by records of capture was for *Musca domestica* 15 days, for *Chrysomya macellaria* 17 days, and for *Phormia regina* 10 to 11 days.

(8) Without stating the basis for their belief, the authors of the article under abstraction nevertheless advance the opinion that these experiments by no means indicate the extreme possible limits of fly dispersion, and they apparently expect future investigation to show that under conditions which favor the production of great numbers of flies the extreme limits of flight will be found to be much greater than the maximum as determined by them.

The information here presented is of much importance to the camp sanitarian. It teaches, in the first place, that he and the camp commander can not be held responsible for the numbers of flies present within the camp limits to as great an extent as was considered to be the case when it was thought that flies were produced, lived, and died within very restricted areas, having a radius of not more than a mile or two. It indicates also that the possible sources of infection from which fly-borne diseases may be brought to a camp or post by these insects are much more numerous (because more widely distributed) than was formerly held to be true, and it therefore empha-

sizes the necessity of an active campaign which shall continue throughout the fly season looking to the destruction of adult flies as well as to the most complete suppression possible of all those factors which may serve to attract these insects. Finally, it indicates that great necessity for a much closer cooperation in effort between all sanitary authorities—national, State, municipal, and military—to the end that the breeding of flies may be reduced or eliminated so far as may be possible. (Medico-Military Review.)

From the Lancet for October 29, 1921, we learn that a meeting to form an International Association of the History of Medicine was held in Paris on October 8, at the Faculty of Medicine, at which representatives from Great Britain, Holland, Belgium, Spain, Portugal, Denmark, Norway, Switzerland, Rumania, France, and other countries were present. The object of this association is to pursue the study of the history of medicine by means of research, bibliography, and communications presented by its members for discussion at the future meetings of the international congress. The association is the outcome of the successful international congresses, the first of which was held in Antwerp in 1920, and the second in July last in Paris. It was then decided to form a permanent bureau or committee to meet in Paris to draw up a constitution and make regulations to indicate to members various subjects for research and investigation, so as to insure unity and continuity, and to make their work of practical value. Prof. Jaenselme (Paris) presided and extended a cordial greeting to the foreign representatives. Prof. Laignel-Lavastine, general secretary of the Faculty of Medicine of Paris, then outlined the proposed constitution. He suggested that the permanent committee should consist of a president, vice presidents, secretary and treasurer, and delegates from each country represented. This proposition was accepted by the meeting, and Dr. Tricot-Royer (Antwerp) was elected president, Dr. C. Singer (Great Britain), Profs. Giordano (Italy), Menetrier, and Jeanselme (France) were appointed vice presidents, Dr. Fosseyeux archivist and secretary, and Dr. Boulanger treasurer of the permanent committee of the bureau.

Dr. Singer conveyed an invitation from the section of the history of medicine of the Royal Society of Medicine for the third international congress to meet in London next year, which was cordially accepted, and the approximate date was fixed for the meeting for July 24 to 29, 1922. The following subjects were suggested for the consideration of the members of the next congress: (1) Principal seats of endemic and epidemic diseases in the classical Orient during

the Middle Ages. (2) History of anatomy. (3) Revival of medical knowledge during the sixteenth century.

The following editorial article appeared in the New York Medical Journal for November 16, 1921:

"One of the lessons learned during the war, or at least acutely emphasized, was the importance of the immediate incineration of latrine contents in preventing the spread of infection. The knowledge in this direction gained in war time will be of great value in civil life, in connection with camps, as incineration appears to be both simple and effective.

"At the annual meeting of the British Society of Medical Officers of Health, held in London on September 30, Major General Sir W. G. McPherson read a paper on the disposal of latrine contents, with special reference to immediate incineration. He pointed out that the prejudice against this system was due to ignorance of its advantages, and he went on to describe the appalling conditions produced by the prolonged use of the shallow and deep trench systems unless under constant and careful supervision. There were two recognized methods of disposal by incineration; in one the latrine contents were carried in buckets or carts to incinerators at some distance from the latrines, and in the other the excreta were disposed of immediately in an incinerator placed in or near the latrine.

"After detailing the drawbacks and advantages of the first method, Major General McPherson discussed immediate incineration, stating that the Germans in 1902 made the first experiment in this mode, but after an unfair trial abandoned the system. The McCall system, initiated by the American Army during the Cuban war, had been abandoned owing to the expense of fuel and the iron plates. McPherson said that he had had personal experience with the method before the war, both in India and Aldershot, and here the simple device of placing a layer of bhoosa or other dry material on the ground, making the men defecate on it, and then setting fire to it, proved extraordinarily satisfactory.

"In 1915 in France, and later in Saloniki, he had started a method of immediate incineration, which was described in the Journal of the Royal Army Medical Corps in 1915. The essential principles were, first, the disposal of the urine by the men themselves, either by emptying the receptacles into absorption pits, or by passing urine into a channel leading to the pit; secondly, the deposition of excreta into the incinerator immediately after defecation, also by the men themselves. The incinerator could be of the open or closed variety and was frequently made out of a cresol drum, placed in or near the latrine. This method proved entirely satisfactory. A ser-

geant major in France maintained that it possessed the following advantages: (*a*) Cleanliness, freedom from flies, and comparatively little odor; (*b*) definite area involved and practically no soiling of the ground; (*c*) only one sanitary attendant required; (*d*) it could be placed at a convenient distance from the men's living quarters without fear of offense; (*e*) it could be constructed of materials usually available in any camp by any intelligent noncommissioned officer within three or four days of arrival at the permanent camping site.

"Lieutenant General Sir John Goodwin, in discussing the subject, said that the method of immediate incineration was ideal and should be applied in boys' camps. The difficulties in future wars would be overcome if the civilian population was instructed in its use in peace time. The most serious criticism of the method was made by the well-known sanitary authority, Lieutenant Colonel H. R. Kenwood, who thought that water carriage was always the best and the cheapest in the long run. He considered the dry earth system the next best; it produced no odor and no flies. Incineration was valuable and useful, he said, but he knew that in some instances this method had had to be abandoned on account of the odor; probably the system of individual incineration would cause little or no nuisance in this respect. McPherson declared that there was little or no smell in the individual method and said that two small cresol drums made into incinerators had, in France, dealt daily with the excreta of 2,000 men."

The Far Eastern Association of Tropical Medicine, to which the progress of tropical medicine in the East owes much, will hold a meeting this year in Singapore. The association was founded in 1908 at a meeting held in the Philippine Medical School, Manila, and has as its object the promotion of the science and art of tropical medicine and of friendly international intercourse between physicians and scientists interested in this specialty.

The association has been instrumental in raising the standard of medical education in the East, in enlightening and directing public opinion in regard to the problems of hygiene, and in forming habits conducive to the prevention of disease among native populations.

Meetings of the association are held biennially; the first congress was held in Manila in 1910, the second at Hongkong in 1912, and the third at Saigon. The war interrupted the meetings, but now we are glad to learn of their resumption and will await with interest the reports of this year's meeting.

Dr. A. H. Macklin, now surgeon to the *Quest* on its way to the Antarctic, has published an interesting account of how the sick and

wounded were cared for in the mobile columns of the North Russia Expeditionary Force. Written in the first instance as a thesis for the M. D. degree of the University of Manchester, it gives a new insight into the efforts of that gallant little army. Major Macklin (as he then was) had served as surgeon—and dog-driver and handyman, as explorers must be—in the Shackleton Antarctic Expedition of 1914, and, on his return, after distinguished service in France and Italy, he became senior medical officer to the mobile columns of the North Russia Army. Ordinary equipment and methods of warfare were quite inadequate, and so "mobile columns" were formed to carry out operations against the enemy. These units were designed to go from a center over trackless and snow-bound regions, attack the enemy and return. During the time each was absent it had to depend entirely upon its own resources, and had to carry all its own cover, food, and fodder for animals. In each unit there were some 260 men, trained in the use of skis and snowshoes, their transport consisting of sledges drawn by horses, reindeer, dogs, or men, and they had to cover any distance up to 200 miles in a maximum time of 15 days. To carry out his duties, Major Macklin had to arrange for dealing with sick and wounded men 100 miles distant from the nearest source of surgical assistance, so that their chances of survival must have seemed very remote, for such extreme cold rapidly benumbs a devitalized man and makes him helpless. Each unit of the mobile columns had therefore to contain a large number of men trained in first aid, and had to be accompanied by a medical officer; the difficulties were multiplied when the columns split into numerous small parties. Operations in North Russia, it will be remembered, were directed to the defense of the ice-free ports on the Murman coast—at first against the Germans, who occupied Finland, and, later, against the Bolshevists in the south. The military and strategical value of sending out these small detachments so far from their bases to give sporadic pin pricks to an enemy of indefinite strength was perhaps more evident to the high command on the spot than it is to us to-day. Be that as it may, the mobile columns carried out their instructions in the most gallant fashion, and their medical arrangements, which were well thought out, proved adequate. Major Macklin's previous polar experience was naturally of the greatest value; he was accustomed to the climate, to the equipment, and to the method of transport. He had himself driven dog transport in the Antarctic regions, and he was familiar with the measures necessary for portection against the climate. He found that while reindeer were the best type of transport in barren regions, the area in which they could be used was limited to that in which reindeer moss grew; ponies were the most suitable in the populated areas, but dogs could

be used under all conditions and when ponies and reindeer were useless. Men, though the most reliable for haulage purposes, were yet the slowest and most extravagant in food. As large and complete an equipment as possible was desirable; but, on the other hand, it had to be rigidly limited to a weight and bulk which could be safely transported. The system of evacuation followed, as far as possible, the usual military procedure by which the regimental medical officer accompanying the unit was responsible for the evacuation of the wounded to his aid post; from this point the responsibility devolved upon the officer commanding a field ambulance, whose duty it was to collect wounded from the aid post and evacuate them to a dressing station. Thus, when a man was wounded he was attended on the spot by the regimental stretcher bearers, evacuated to an aid post, where he was attended by a medical officer, examined, redressed, and prepared for the long sledge journey to the advanced dressing station, passing a series of medical and transport relay posts. The advanced dressing station was so situated as to lessen the distance of the sledge journey as far as possible, but was placed at a point where it could receive adequate medical and general supplies. The medical equipment caried in the mobile columns had to be light, and consisted only of those things which were absolutely necessary; this equipment was carefully selected by Major Macklin, who gives full details. His knowledge of polar climates had taught him that frostbite was very liable to occur even in healthy men living under the conditions met with by the mobile columns, and his notes on this subject are of special value; he considers that brisk dry rubbing without oil produces better results than massage with oil, and that steps ought, in fact, to be taken to prevent the access of grease or oil to the skin or clothing.—(British Medical Journal, November 19, 1921.)

The following method for manufacturing soft soap is taken from the Medico-Military Review:

Old grease and fat trimmings, 12 pounds after rendering; concentrated lye, 4 cans. Water sufficient to make 50 gallons of soap. Dissolve the lye in 6 gallons of water; add the grease and allow the emulsion to stand for 2 hours; boil for 30 minutes with constant stirring. During the boiling, small quantities of water, about a quart, must be added from time to time to prevent the mixture from boiling over the top of the can. After boiling for 30 minutes, sufficient water is added to make up the 50 gallons of soap.

The fire-prevention committee of the Building Managers and Owners Association of New York has issued the following bulletin to

ts members: "The upkeep of rats has gone up. A year or so ago some one figured out that it costs us $1.80 per person per year to feed the rats in the United States. Recent figures compiled by a British expert place this cost in the United States at $750,000,000 a year, which is a trifle over $7 per person. This is simply for food consumed and destroyed and has nothing whatever to do with the very considerable fire loss they cause.

Through an error the name of Captain T. A. Berryhill, Medical Corps, United States Navy, appears in connection with the annual sanitary report from the United States naval hospital at Great Lakes, Ill., on page 34 of the Annual Report of the Surgeon General, United States Navy, for the fiscal year 1921. This report was written by Captain R. P. Crandall, Medical Corps, United States Navy, and his name should have been appended to the abstract of the report in question.

87783—22——8

NURSE CORPS.

NURSING—1814—PROPHECY.

Few who enter the office of the Surgeon General of the Navy fail to notice the pictured face of William P. C. Barton, A. M., M. D., a surgeon of the Navy. Even a casual glance registers the impression of manliness and dignity; the brow and eyes indicate the student; the mobile mouth shows that sympathy, helpfulness, and humor were ever present to temper erudition to human needs. In 1814 a treatise was written by Dr. Barton which contained "A scheme for amending and systematizing the Medical Department of the Navy." The book is one of the treasures of the Navy Department and will repay in interest anyone who is so fortunate as to be able to read it. For the information of the members of the Navy Nurse Corps, excerpts have been taken from the "Scheme" which was recommended to "Amend the methods in the marine (Navy) hospitals":

"The nurses, whose number should be proportionate to the extent of the hospital and number of patients, should be gentlewomen of humane disposition and tender manners; active and healthy. They should be neat and cleanly in their persons, and without vices of any description. They are to attend with fidelity and care upon all the sick committed to their care; should promptly obey their calls, and, if possible, anticipate their reasonable wants. They should administer all medicines and diets prescribed for the sick in the manner and at the time specified in their directions. They should be watchful of the sick at all hours; they should attend the physicians and surgeons in their visits to the wards to give information respecting the patient and to receive orders and directions. They should obey punctually all orders from their superiors and should exact a ready acquiescence in their commands from those under them."

"All patients in the hospital shall be obedient to the proper and legal orders of the nurses, and, indeed, all persons in authority."

"It shall be the duty of patients in a sick ward to reciprocate and interchange with their fellow patients and sufferers in disease such little offices of kindness, humanity, and attention as they may be able to afford for the comfort and convenience of the whole."

Many other recommendations contained in this wonderful book have materialized in time, as did the recommendation for a corps of

trained women. This remarkable man had vision; and the courage to stand for the principles which would make that vision a reality. Those whose private interests were impaired by his determination to advance the interest of his department became enemies, and in conclusion he states:

"My feelings and my fortune have suffered by a determination I made when I first entered the service, from the execution of which I never in a single instance swerved, to pursue that line of conduct that I deemed consistent with the faithful performance of my duty and my trust, however such conduct might clash with the private interests of others, or differ from the customary proceedings of persons similarly situated with myself."

NURSING—1922—DEVELOPMENT.

From January 16, 1922, to January 28, 1922, there was held in Washington, D. C., "A Conference of Officers in Charge of Government Hospitals Serving Veterans of the World War." The superintendents of nurses of the Government services were directed to be present and to present the topic of nursing at the meeting of January 18. The subject was opened by the Superintendent of the Army Nurse Corps. Her excellent paper is briefly reported as follows:

"The response of the nursing profession to the call of the country during the time of war is well known, and the character of the achievements of the 25,000 trained women who entered the Government services at that time has been often recounted, but little has been told of the patriotic devotion to duty that has been exhibited by nurses since the armistice. I do wish to call attention to the marvelous development of one branch of governmental nursing work under conditions that in many instances were harder to bear than most war conditions, and to ask for the service the recognition and cooperation it deserves. At the present time there are more nurses in the United States Public Health Service (1,796) than there are in the combined nursing departments of the Army (774) and the Navy (488). The figure given me for the present Public Health nursing staff is about 1,800, an expansion from forty-odd at the time the service was authorized to care for ex-service men, by act of Congress on March 3, 1919. To realize the full meaning of this expansion and the development of the organization required to manage this service, it is only necessary to recall the fact that in the spring of 1919 when the Public Health Service called for volunteers for its nursing service, the Army and the Navy were both discharging from their Nurse Corps great numbers of women. In one month alone in that year 2,500 nurses were demobilized from

the Army. They were all tired, worn-out women. You all recall the state of mind of both the soldier and the officer during those months, when morale was at its lowest ebb, because of homesickness, fed-up-ness, and desire to get back to civil life. Nurses as well as men were full of complaints, and to be freed from governmental control was the thing that to all of them seemed the ultimate good. Moreover, many who came from overseas had been marking time for weeks, awaiting orders for the breaking up of their units, and embarkation, and upon their arrival home they found that their communities, which they had left so short of nurses, were clamoring for their services.

"Under such conditions was presented the need of the ex-service man. A new Federal nursing department asked them to give up their personal desire for freedom, their longed-for plans, and to enter—what? and to do—what? It is hardly necessary to describe the kind of hospitals these nurses were asked to enter, nor the conditions under which they were to live. You would scarcely believe the details of which I could tell you, unless you, too, have heard the accounts of the able superintendent of nurses of the Public Health Service. You know, perhaps, what some of the old marine hospitals are like, and some of you know what some of the old Army hospitals taken over by the Public Health Service were like. You don't know, I am sure, about the utterly unworthy and unsuitable quarters and messing arrangements for nurses which many staffs have had to endure, and still do endure in some instances. The fact that there are now 1,800 nurses in the service bears witness to the clearness of her vision of the need on the part of the superintendent of the corps, and her valiant presentation of it, and to the assistance given her by the American Red Cross Nursing Service which has spread the call and facilitated recruiting.

"The greatest problem of the nursing care of the ex-soldier is, of course, in the United States Public Health hospitals.

"Let us consider the type of patient. We are told that neuropsychiatric, contagious, and tuberculosis cases predominate. Right here is one difficulty as far as nurses are concerned. To contribute the highest type of service to people so afflicted requires that the living conditions, the mental and physical recreation and upbuilding of the nursing staff, be of the finest order. I think that this is conceded by all who consider the long hours during which the nurse is in close contact with the patient and who realize that no individual, barring none, has so large an opportunity for personal influence upon patients as the nurse.

"Nurses who are employed for the care of the veteran should be of the highest grade. Not only should they meet all the professional and technical requirements, but they should be especially qualified

in all phases of rehabilitation and reconstruction, both mental and physical. They should have an especial knowledge of the problems of the tuberculosis patient, not only as an individual sick man, but in his relation to society. They should be thoroughly cognizant of the magnitude and urgency of the problem of social diseases; and without an ability to help the neuropsychiatric patient redirect his interests into the world of reality and to correlate himself and his environment they are failing in their whole duty to their patient.

"The turnover in the nursing service in hospitals caring for veterans is unduly large, the reports show. This has been due in some degree to physical breakdown, and also to dissatisfaction with conditions, including uncertainty as to their status and fears for its future. What, then, is to be done? The answer is not so hard to find. Locally, it is comfortable living quarters, reasonable hours, good food, the right sort of recreation, adequate pay, and opportunity for advancement and improvement. Nurses, like all other professional workers, are coming to recognize that in order to live up to their highest ideals and to give their best service to afflicted humanity it is essential to make provision for continual growth, and that from time to time added inspiration and education are necessary. Courses of special study are advocated, therefore, for all nurses, especially for those caring for veterans or any other particularly difficult group of patients. Opportunity for postgraduate study is considered a necessity in the Army for both officers and members of the Nurse Corps, and it is even more important in the United States Public Health Service. In some hospitals of this service special courses have been conducted for nurses with marked success, but particular emphasis should be given to this phase of meeting the nurses' problems, for before a nurse can help to reconstruct a distorted mental outlook and restore a normal attitude toward life, she herself must have an understanding and a sympathy and a power to help that can only come from steady inspiration, constant study, and serenity of mind.

"Second in importance locally is the recognition on the part of the commanding officer of each hospital and such member of the hospital staff of the real place of nurses in the endeavor to return the patient to normal health and life, and emphasis upon an attitude of helpfulness and cooperation in all matters concerning them. Only those who have served in hospitals where the commanding officer was heart and soul in sympathy with the problem of the nursing staff and concerned with every detail that might work for its well-being, can know what a harmonious, helpful atmosphere can exist and how the spirit of courteous recognition and mutual respect can permeate from the commanding officer to every member of the personnel. For is not the nursing group usually the largest group in every hospital, and will not the attitude of the nurses give the tone to the hospital?

Commanding officers should remember that in their hands and theirs alone rests the regulation of this tone."

The discussion was opened by the Superintendent of the Navy Nurse Corps and the following points were emphasized:

"In the naval hospitals which have had the greatest success in treating the service beneficiaries the commanding officers have put a frank presentation of the situation to the patients, pointing out the necessity for certain restrictions and discipline, and urging cooperation. This preliminary presentation by the commanding officers when followed by the kind, yet firm, supervision of the ward officers and also by the tactful, helpful attitude of the nurses, who in turn cooperate with the welfare and vocational workers, in time break down the attitude of opposition, resentment, and destructive criticism which many patients have when first hospitalized. The chief nurses have stated that the care of these patients means only 'more patients.' There is no special problem in dealing with them under the above conditions.

"It would seem, therefore, that the problem, as has already been pointed out, exists chiefly in the United States Public Health hospitals where the greater number of patients from the Veterans' Bureau are receiving care and treatment.

"There is considerable discussion among doctors, at present, regarding the fundamental qualifications which the trained nurse should possess and there have been charges of overeducation and a tendency to commercialism which result in unrest and in losing sight of the basic principles of our profession. The charge of commercialism is so unworthy of the medical profession that I shall let it pass without comment, but I do not consider it beside the present question to comment upon the statement of overeducation. It may be conceded that a nurse, possessing a preliminary graded school education, who has been carefully taught for two or three years in an accredited hospital, is able to give nursing care, under medical supervision, to the sick bed patient. Her greater value to the physician and to the patient because of greater knowledge due to higher educational standards need not be discussed here. It must be further conceded, however, in dealing with the phase of the nurse's work which we are discussing that the influence of nurses on the patients of the Veterans' Bureau is more constructive mentally and morally than is the influence of nurses who care for the acutely sick; which is, usually, particular personal care for a comparatively brief period. Nurses who care for convalescent and Veterans' Bureau patients are required to serve long hours of duty in which little change in the condition of the patients is noted; and yet so great is this responsibility, so important is the work from the humanitarian and economic viewpoints that the nurses must be always on guard against the insidious lack

of interest which comes from routine care; and they must keep themselves so alert that their great opportunities for personal influence among these men shall not be neglected in any particular. With any degree of sickness, there is distorted judgment and predisposition to give undue stress to trifles. The educated nurse knows this and knows also that the semihelplessness of protracted convalescence and the resultant sense of dependency are among the chief factors which must be considered in dealing with these special patients. She must influence the patients to be receptive to hospital restrictions; she must counteract the tendency to destructive criticism and disloyal statement; she must be sympathetic but not maudlin; she must recognize that her patients are ill but she must not encourage helplessness; she must suggest activity and encourage pride in endeavor and accomplishment. She must present the best viewpoint to the particular patient, and this means an individual understanding of him and his needs. Only educated nurses (meaning that the aim of education is to develop the faculties of the mind and body) who have courage, refinement, and dignity, who are loyal to their country without the stimulus of war, and who strive to maintain the high ideals of their profession, can be successful in cooperating with other agencies to restore these men to health. More and more it is recognized that we must look to education to destroy irrational suspicion and to restore to health and sanity. Reconstruction and rehabilitation of the ex-service men can not be an affair of merely rearranging tangible elements, such as food, money, and clothes; it is by example, by encouragement to make an effort to overcome helplessness, by explanations of the reasons for necessary treatment and restrictions, that the nurse will succeed in helping to replace quiescent dependence with the unsleeping desire and motive of service as active citizens.

"The Public Health Nursing Service has been established a comparatively short time, and yet, due in a great measure to the indefatigable efforts of the present Superintendent of Nurses, who has held persistently to a high professional standard despite tangible and intangible difficulties, more qualified nurses are attached to this service at the present time than are to be found in the combined older services of the Army and Navy Nurse Corps. Having procured these nurses who, for the most part it is believed, accept the additional responsibilities which the care of such patients involve, every effort that is made to retain them is worth while, since their value increases with length of service. From an economic viewpoint, if for no other reason, efforts should be made to give these nurses adequate payment for trained service; to provide living conditions which they require as educated and refined women; to recognize that rest and recreation are necessary if the physical standards and morale are to be maintained; to acknowledge their professional

status and to give recognition to them as coworkers with the medical profession.

"With these requirements satisfactorily adjusted by those who have the power of formulating the necessary rules and regulations, the work of the nurses who care for the maimed bodies and sick minds of the patients of the Veterans' Bureau will be productive of even greater beneficent results than have already been obtained—for such nurses seek to maintain the fabric of the world and in the result of their unselfish efforts is their prayer."

The Superintendent of the United States Public Health Service continued the discussion:

"The most urgent problems and difficulties existing in the Public Health Service hospitals dealing with the ex-service men have been placed before you, but the ever-present difficulties can be realized and understood only by those who are in close association with the services. That the nursing department of the Public Health Service has been able to accomplish even a measure of success has been due in a large degree to the cooperative counsel and advice given by the superintendents of the established nurse corps of the Government.

"On March 3, 1919, the Public Health Service had available 1,500 beds in 23 hospitals, and practically no nurses. Chief nurses were unknown in any of the hospitals. There was no machinery for the recruiting of nurses. In regular service hospitals there were no quarters for nurses, and the service is still concerned over a solution of these difficulties. At the present time there are 1,796 nurses in the hospitals operated by the Public Health Service.

"The Nurse Corps of the Public Health Service is a civilian organization, pure and simple, though 99 per cent probably of the nurses now serving in the Public Health Service are ex-service nurses and familiar with the problems of the care of ex-service men.

"The aim of the nursing department of the Public Health Service is to give as efficient nursing care to the patients in these hospitals as can be given; to see that the nurses cooperate in every possible way with those responsible for the care of the patients—that is, the medical officers in charge; to recruit a sufficient number of qualified nurses to meet the needs of the service; and to recommend the establishment of such policies in the nursing department as will increase the efficiency of the Nursing Corps. The cooperation of the medical officer in charge is essential; his sympathy with and support of the chief nurse must be unquestioned if the nursing service is to reach the greatest efficiency. The place of the nurse in the administrative unit of the hospital should be clearly and definitely defined, understood, and observed.

"One great difficulty confronting this department is the lack of nurses specially trained in the care of neuropsychiatric and tuber-

culosis patients, who constitute a large proportion of our patients. To partly meet this need, a school for nurses conducted at Oteen in September, 1921, was organized and, while this school was must successful, it barely touched the fringe of our necessities. The service is considering a similar course in neuropsychiatric nursing as soon as there is established a station where all conditions, quarters, lecturers, and teaching facilities can be guaranteed to produce the desired result.

"One piece of nursing work which has been far-reaching in its effects was the establishment of a Public Health nursing unit in the office of the supervisor of district No. 4, for the purpose of making contact with the claimant of the then Bureau of War Risk Insurance, with a view to giving the claimant, who for any reason was not hospitalized, the benefit of health supervision and health instruction. The success of the work of this unit more than justified its establishment by the United States Public Health Service.

"The type of nurse needed for this service is the broad-minded woman, cultured, well-trained, with those qualities of mind and heart which would enable her to grasp the tremendous responsibilities in the work we are trying to do—who will be sympathetic, but firm—who will be able to emphasize the need for obedience to orders for treatment—who can be friendly, without familiarity, and loyal to the highest ideals of her profession.

"The turnover is too large, by far, and is due in some measure to conditions which are unavoidable, since they are the result of the sudden expansion of the service, the need for immediate action, and the great difficulty in securing desirable hospital stations, both from the standpoint of construction and location. These conditions are adjusting themselves gradually, and a distinct improvement in service and morale in the nursing department, a clearer understanding of the many problems which confront the administration and the service in the effort to give the best medical care and treatment to disabled veterans of the World War, is evidenced; and at the present time the United States Public Health Service is able to keep the nursing force up to the necessities of the service.

"It is believed, however, that uniformity throughout the organizations caring for these patients would go far toward establishing a more satisfactory service, and it is hoped that this meeting of all connected with and interested in the care of ex-service men will succeed in bringing about this desired result.

"In the final analysis, however, it is conceded that the responsibility for the proper and successful conduct of these hospitals rests with the medical officers in charge, and I can truly say in behalf of the nurses of the Public Health Service that the nursing section will cooperate in every possible way to promote the successful organization

of the hospital program, and to assure this meeting that the nurses of this service will continue to 'carry on' and to render all assistance in their power toward the accomplishment of this result."

At the close of the paper and discussion several medical officers testified to the important rôle of the nurses in the Government hospitals, and expressed the desire that the regulations could be so definite and uniform to prevent individual misinterpretations which were professionally embarrassing and discouraging to nurses. A ranking naval medical officer confessed that he was opposed to the establishment of the Navy Nurse Corps, but he has been converted and felt that the service was benefited in every way by the cooperation of these professional women.

During the session when resolutions were in order, Captain Norman J. Blackwood, Medical Corps, U. S. Navy, U. S. Naval Hospital, Boston, presented the following resolution, which was approved without a dissenting voice:

"*Be it resolved*, That it is the sense of this meeting that the pay of nurses of all branches of the Government service is far below what it should be, and therefore is a detriment to the entrance to or continuance in those services of the better type of nurses; and that it be urged upon Congress by the Federal Board of Hospitalization that legislation be enacted to remedy this condition."

At the last session of the conference General Sawyer extended his gratitude to the nurses and expressed his appreciation of the ideals and aims which had been outlined in the papers presented.

On the evening of January 20 the President and Mrs. Harding received the superintendents of Nurse Corps of the three services as delegates to the conference.

DIGEST OF DECISIONS.

CORRESPONDENCE REGARDING SECTION 315 OF THE ACT OF AUGUST 9, 1921.

WSD/JBC 129733 (111)

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., November 2, 1921.

To: Secretary of the Navy.

Subject: Act of August 9, 1921, "To establish a Veterans' Bureau and to improve the facilities and service of such bureau, and further to amend and modify the War Risk Insurance Act"; application of section 22 to persons reenlisting.

1. The above mentioned act contains the following provision:

"SEC. 22. A new section is hereby added to Article III of the War Risk Insurance Act, to be known as section 315 and to read as follows:

"Sec. 315. That no person admitted into the military or naval forces of the United States after six months from the passage of this amendatory act shall be entitled to the compensation or any other benefits or privileges provided under the provisions of Article III of the War Risk Insurance Act, as amended."

2. This provision is understood to render inapplicable to persons *first* entering the military or naval service subsequent to February 8, 1922, the provisions of Article III of the War Risk Insurance Act of October 6, 1917, as amended, relative to compensation for death or disability, but this bureau is not clear as to its application to persons who, having been admitted into the military or naval forces prior to February 8, 1922, subsequently shall be discharged and reenlisted, either within the period allowed for reenlistment with continuous service or later. It appears that Article III will continue to apply to those persons (officers) admitted into the service prior to February 8, 1922, whose service is continuous.

3. The bureau therefore requests decision on the following specific points:

(*a*) Will the provisions of Article III apply to a person who having been admitted into the service prior to February 8, 1922, is discharged and is immediately (or within the period allowed for reenlistment with continuous service) readmitted?

(*b*) Will the provisions of Article III apply to a person who, having been admitted into the service prior to February 8, 1922, is discharged and is later (but not within the period allowed for reenlistment with continuous service) readmitted?

(*c*) To what benefits for death (other than the gratuity of six months' pay) or disability are persons in the naval service entitled who are excluded from the provisions of Article III, above mentioned?

/s/ F. L. PLEADWELL.

McN–Ca

DEPARTMENT OF THE NAVY,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, 27 December, 1921.

From: The Judge Advocate General.
To: The Chief of the Bureau of Medicine and Surgery.
Subject: Act of August 9, 1921, "To establish a Veterans' Bureau and to improve the facilities and service of such bureau, and further to amend and modify the War Risk Insurance Act"; application of section 22 to persons reenlisting.
Reference: (*a*) Your letter of November 2, 1921, to the Secretary of the Navy, 129733(111) 18 WSD/JBC. (*b*) Letter from this office to your bureau, November 21, 1921, 28909–416.

1. In reference (*a*) you requested the opinion of this office on a number of propositions arising under section 22 of the act of August 9, 1921, establishing a Veterans' Bureau. In reference (*b*) you were advised that, inasmuch as the propositions presented in reference (*a*) related to matters exclusively under the jurisdiction of the Veterans' Bureau, said bureau had been requested to furnish the department an interpretation of the application of section 22 to said propositions.

2. A copy of the decision of the Veterans' Bureau upon the propositions presented in reference (*a*) is enclosed herewith.

/S/ J. L. LATIMER.

UNITED STATES VETERANS' BUREAU,
Washington, December 9, 1921.

J. L. LATIMER,
Judge Advocate General,
Navy Department, Washington, D. C.

SIR: Replying to your letter of November 21, 1921, relative to the construction of section 315, War Risk Act, you are advised, in answer to propositions (*a*) and (*b*) submitted by you, that it is the opinion of this bureau that each term of enlistment must stand on its own bottom and that any person who sustains a compensable injury during a term of enlistment, which began prior to February 8, 1922, is entitled to the benefits of Article III, War Risk Act. On the other hand, any person who sustains an injury during a term of enlistment which begins after February 8, 1922, will not be entitled to the benefits of Article III, War Risk Act, irrespective of whether such person had been in the service prior to February 8, 1922, and had served continuously.

In answer to (*c*) it is sufficient to say that persons who enter the naval service after February 8, 1922, will be entitled to the benefits of section 13, act of August 9, 1921, and may avail themselves of the benefits of contract insurance.

A bill has been introduced in the Senate to repeal section 315, but has not been acted upon.

Yours, very truly,

/S/ C. R. FORBES, *Director.*

LINE OF DUTY.

In a recent case coming before the department the following question was presented, i. e., "Whether or not a member of the naval service who has successfully passed the prescribed physical examinations for admission therein,

but who is subsequently found to be suffering from tuberculosis, is entitled to a finding of line of duty in the absence of positive facts to the effect that the disease existed prior to his appointment, enlistment, or enrollment in the naval service, or that it was due to his own misconduct."

Citing a recnet opinion of the department (May 19, 1921, File 7657–390: 40) it was held that under the decision of the court in the case of Moore *v.* The United States (48 Ct. Cls. 110) a presumption raised by facts developed subsequent to enlistment is not sufficient. The facts which must be shown in a case where this question is involved before a finding of not line of duty is warranted, in the absence of fraud, are facts established by proof of their existence prior to enlistment; for example, if it is shown from the records of a creditable institution or the testimony of a reputable physician attending the complainant, prior to his enlistment, that he was suffering from tuberculosis, chronic, pulmonary at that time; or if a statement of the claimant describing certain physical conditions which he had noticed prior to his enlistment is submitted and this statement could have no other plausible explanation than that he was suffering from tuberculosis in some form at that time, i. e., prior to his enlistment, a finding of "not in line of duty" would be warranted, but under no other conditions except where fraud is shown. The disability complained of in the case under consideration having been discovered after the individual had entered the naval service, and no facts being presented showing that he was suffering from said disease prior to his enlistment or that his enlistment therein was obtained through fraud such as to vitiate the effect of the physical examination given him at the time, it must be held that the disability complained of originated in line of duty regardless of the fact that it was discovered almost immediately after his enlistment. (Sept. 15, 1921—File 29372–8, J. A. G.)

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Lieut. Commander C. W O. Bunker, Medical Corps, United States Navy.
Lieut. Commander John Harper, Medical Corps, United States Navy.
Lieut. L. W. Shaffer, Medical Corps, United States Navy.

"A book is a friend that never deceives." Guilbert De Pixérécourt.

DISEASES OF THE SKIN, by *Henry W. Stelwagon, M. D. Ph. D., late professor of dermatology in the Jefferson Medical College.* Ninth edition. Prepared with the assistance of Henry K. Gaskill, M. D., W. B. Saunders Co., Philadelphia, Pa., 1921.

Dr. Stelwagon began the revision of his Treatise on Dermatology for the ninth edition in the spring of 1919, but failing health prompted him to request the assistance of Dr. Gaskill in the revision.

Upon his death Dr. Stelwagon left many notes and abstracts of various subjects which Dr. Gaskill has used to the best advantage in this edition. Stelwagon's Diseases of the Skin has for some years been considered one of the most thorough treaties on diseases of the skin in the English language. The great care with which each dermatological condition is considered makes the volume especially valuable for reference, not alone to the general practitioner, but to the dermatologist and those interested in special fields of dermatological investigation as well. (L. W. S.)

THERAPEUTIC IMMUNIZATION IN ASYLUMS AND GENERAL PRACTICE, *by W. Ford Robertson, M. D.* William Wood & Co., New York.

A book written apparently for the purpose of expressing the author's own views on the theory of therapeutic immunization, the

róle bacteria play in the etiology of such diseases as exophthalmic goiter, diabetes mellitus, pernicious anemia, rheumatoid arthritis, various nervous and mental diseases, etc., and the results he has obtained by the use of vaccine therapy in these diseases.

As the author well states in his preface, "numerous facts new to science are recorded and many heterodox opinions are expressed that are not likely to be accepted without a fight."

Prominent among the facts new to science and the heterodox opinions is the pathological importance of bacilli of the diphtheroid group, the original article of which, according to the author's own statement (p. 152), was returned by an editor of a leading medical journal as not being of sufficient interest for publication.

Chronic infection by members of this group is held to play no small part in the etiology of certain types of neurasthenia, acute toxic insanities, general paralysis, tabes dorsalis, and dementia precox.

The author, skeptical that infection by the Spirochæta pallida is a complete explanation of general paralysis, states that in general paralysis and tabes dorsalis the chronic diphtheroid infection is perhaps always associated with syphilis.

Exophthalmic goiter, psoriasis, and several other diseases, of at present doubtful etiology, are likewise associated with this group of organisms.

Pernicious anemia and rheumatoid arthritis are explained in part by a pneumococcus and diabetes mellitus by an anærobic streptothrix.

Having constructed an etiological system of his own it is not at all surprising to find that the author has obtained, to his own satisfaction, satisfactory results from vaccine therapy.

It is regrettable that the author permitted enthusiasm to influence his judgment and choose this method of presenting his views to the profession. (J. H.)

Practical Chemical Analysis of Blood, by *V. C. Myers*. C. V. Mosby Co., St. Louis, Mo., 1921.

In this book Myers has collected a series of his articles that had previously appeared in The Journal of Laboratory and Clinical Medicine. He has also added an appendix dealing with examinations indicated in various diseases, the newer quantitative micro-methods for urine and standard solutions and reagents.

The technique given is that which the author has found most satisfactory, being partly his own, and, although he has not adopted the Folin and Wu system of chemical analysis of blood (available to the service in Stitt's "Practical Bacteriology, Blood Work, and Parasitology," 6th edition), he utilizes many features of it.

An important feature is the space devoted to the significance of findings, as well as historical features. The book can be highly recommended as affording a clear view of this comparatively new and useful field, and, as the complement of Stitt's work (mentioned above), deserves wide dissemination in our service. (C. W. O. B.)

Essentials of Laboratory Diagnosis, by *Francis A. Faught, M. D.* Seventh edition. F. A. Davis Co., Philadelphia, Pa., 1921.

This new edition endeavors to cover a wide field, but it does so in a manner that does not render it really useful. For the student or inexperienced laboratorian it is lacking in fundamentals and details. For the experienced worker the contents are several years behind the times and do not include many of the newer methods that have made for simplicity and accuracy.

Even the section on sphygmomanometry and sphygmography, from which one might anticipate much, I do not consider very helpful to the man actually doing such work. There is a general lack of needed illustrations, and many of those in the book are poor. The etiological status of some bacteria is not up to date, and the biological nomenclature is to be criticized.

It is an interesting book, but scarcely a commendable addition to recent literature. (C. W. O. B.)

QUERIES.

Medical officers are invited to submit queries and to present their problems to the Bulletin, *which, being in a position to draw on varied and extensive sources of information such as are not available elsewhere, will use every means of securing authoritative opinion.*

All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

To the Editor: What are the special dangers to be noted in connection with the application of paint to large surfaces by means of a spray generated by compressed air? Pigmentarius.

The whole subject of the dangers from spray painting is perhaps still subjudice, since no particular study of the effects of this method of applying paint to large surfaces is recorded. There is, however, no evidence to show that any more danger is attached to the application of paint by means of a spray than by the use of a brush.

Statistics and investigations show that there is little danger under any circumstances from lead compounds in oil if the rules of personal hygiene are regarded. Poisoning usually arises during the chipping or sanding of painted surfaces, at which time the atmosphere may be loaded with dry lead dust.

When using the spraying apparatus the usual precautions applicable to painting in general must be observed; that is, the use of gloves, union-alls and some one of the various types of mechanical respirators.

There may be a dangerous amount of inhalation of lead compounds if—

a. The paint is very finely divided by the spraying apparatus, so that the pigment-bearing oil particles do not exceed 1 micron in diameter.

b. Working in a high wind, which might cause the painter to be enveloped in a cloud of spray.

c. Working in a small closed compartment, as between the skins of a ship.

Under the conditions mentioned above, if the inner layers of the respirator show no paint no deleterious effects may be expected.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

TWO DEATHS CAUSED BY ACCUMULATION OF CARBON DIOXIDE IN A FLOUR HOLD.

The circumstances connected with the recent occurrence of two deaths due to carbon dioxide in the flour hold of a naval vessel is considered of special interest because of the general impression that carbon dioxide rarely occurs in sufficient concentration to prove dangerous to life, and also because this instance points in the most forceful manner to the need of frequently ventilating cargo holds, particularly those in which grain, wheat, and flour is stowed.

Briefly, the facts in the case referred to above are as follows: There were carried in one hold of a ship on the Asiatic Station 35,000 to 40,000 pounds of flour in 50-pound sacks, stowed in layers reaching to nearly the upper deck of the hold. From this lot of flour a number of sacks were removed two or three times a week, or as often as flour was required for baking. For some time prior to the day of the accident it had been noticed by those engaged in the work of removing the flour that the atmosphere of the storeroom soon brought on the usual symptoms indicative of poor ventilation. However, the condition was not reported to the medical or other ship's officers because the symptoms soon passed off when the men reached the upper decks and fresh air. From statements made later by several of these men it appears that previous lots of flour had been taken from the top layer, and that the two men who met death were perhaps the first to attempt the removal of sacks from the bottom of the hold since the flour had been placed on board—about two months. The concentration of carbon dioxide must indeed have been great. Other members of the crew who stood by the open hatch leading into the hold stated that both men dropped almost immediately on reaching the bottom of the hold. Those who undertook to rescue the men were overcome by the gas even before reaching the victims and

their lives no doubt were saved by the timely introduction of air by means of an improvised windsail, which soon rendered conditions possible for further rescue work. Resuscitative measures were successful in saving all except the two men who first entered the hold.

Specimens of air contained in this compartment were examined chemically and found to have a high carbon dioxide content. Furthermore, a candle when lowered into the compartment was extinguished. Both of these tests were made after the windsail had considerably diluted the air in the hold.

In connection with the question of foul air in storerooms and holds, it is, perhaps, not generally known that grain and wheat give off carbon dioxide during its so-called "respiration." Investigations have shown that the moisture content of good grain determines to a considerable extent the rate of respiration which is further accelerated by rise in temperature. While exact figures showing the amount of carbon dioxide generated, incident to the respiration of flour, are not available at this time, the normal quantity is generally considered small and negligible where the flour is stored in a manner permitting free ventilation; in the absence of ventilation, however, carbon dioxide will accumulate and vitiate the air of a storeroom to a considerable extent, particularly in cases where the amount of unoccupied space in room or hold is small. As near as can be calculated from approximate figures given by investigators of this phenomenon the minimum amount of carbon dioxide generated by the flour on board at the time of the accident was probably 3 cubic feet per 24 hours. However, if the flour ran high in moisture (17 to 18 per cent), the volume of carbon dioxide would increase, perhaps even to 40 cubic feet per 24 hours; and, furthermore, under certain conditions of increased temperature the amount of carbon dioxide might even run above the last figures. Flour infested with insects generally gives off a relatively high amount of carbon dioxide.

Even acknowledging that the volume of carbon dioxide stated above is not based on exact figures, we must concede the fact that the elimination of carbon dioxide in stored grain and wheat or their products may, in the absence of ventilation, prove a source of danger to life. There is no way to satisfactorily determine, with the equipment on board ship, even the approximate rate of carbon dioxide elimination for any lot of flour. A moisture determination of the grain or flour may prove of value only when used in a relative way, 5.9 high moisture, increased carbon dioxide. An opinion as to the rate of respiration can not be based merely on the appearance of the flour, for in this connection one should bear in mind the possibility of flour being in a condition altogether favorable for increasing the elimination of carbon dioxide without showing any evidence of spoilage in the early stages.

The commissary officer of the ship stated that the flour on board at the time of the accident had been inspected at frequent intervals and found satisfactory; these inspections presumably did not involve any special test for moisture, etc. The flour appeared good and made good bread; therefore, it would seem that the flour must have been in good condition. From what is known generally about flour everything seems to point to an accelerated carbon dioxide rate, which could only be the result of high moisture and perhaps also certain conditions of temperature.

The fact that the men who entered the hold a few days previous to the accident only suffered in a mild way from the vitiated atmosphere, the symptoms disappearing almost as soon as they reached the fresh air, was of course due to the fact that these men worked on the top layer of flour and near the hatch leading into the hold. Carbon dioxide being heavier than air gradually displaced the latter, with the probability that a concentrated atmosphere of carbon dioxide existed near the bottom of the flour hold. The fact that the hatch was opened two or three times a week would probably not result in much loss of carbon dioxide from the storeroom, inasmuch as the greatest amount of carbon dioxide, being heavier than air, would be near the bottom of the hold, and the amount disseminated by diffusion would be small.

In view of the above, all medical officers should inspect thoroughly all storerooms, at least during each weekly inspection, for the purpose of determining whether they are properly ventilated and if proper facilities are provided for this procedure.

NATURE AND MODE OF TRANSMISSION OF POLIOMYELITIS.

In view of the fact that the prevalence of poliomyelitis is by no means confined to children and because the disease has become more and more common in the United States of late years, the following discussion of the nature and mode of its transmission by Dr. Simon Flexner, published in the Health News, of the New York State Department of Health, is quoted herewith:

> The return of poliomyelitis to a number of places in the United States during the past summer and autumn months accounts for the discussion of the subject at this time. Dr. Ball is making so painstaking a study of the cases in his district that I hope he will find time at the end of the epidemic to put his observations into form suitable for publication.
>
> Dr. Ball has concluded from his present study that epidemic poliomyelitis belongs to that large class of communicable diseases in man in which the inciting agent or microbe, or microorganism, is personally transmitted from one to another; and his conclusion conforms to the prevailing opinion of the day as based on previous study of local outbreaks of the disease and on the results of experiments made on animals.

The facts in this paper have been derived chiefly from such experiments. But before I present them I wish to state that the admirable studies of Medin and Wickman of the epidemics which ravaged Sweden over a long series of years brought unmistakable proof of the infectious character and communicability by personal contact of the disease. Moreover, the publications of Wickham emphasized the variety of clinical manifestations of epidemic poliomyelitis, since which we are more and more learning to recognize the disease when, instead of setting in with the usual paralytic symptoms and effects, it appears under other and aberrant forms, resembling meningitis, neuritis, and even a rather fleeting febrile affection without any suggestive diagnostic signs whatever.

Indeed, the disease complex, as we now define it, places epidemic poliomyelitis among the general infections, presenting many and protean clinical symptoms in which the distressing and crippling paralysis—itself so diagnostic—is often wanting entirely, or may be limited in extent or duration, and is at most an accident rather than an incident of the disease. This is a conception quite at variance with the older view which led to the disease being called "infantile paralysis" and which is now discredited entirely, because poliomyelitis may arise without inducing any paralysis whatever, just as it is by no means confined to the young. There is indeed no age immunity, although by far the greater number of cases is found among young children.

In order to understand this change in point of view it is necessary to bear in mind that the old designation "infantile paralysis" is related to the sporadic disease which is practically confined to the very young, and that it is only in recent years that we have become acquainted with the more destructive and inclusive epidemic malady. If there were space I should like to sketch the recent history of epidemic poliomyelitis which, recorded as claiming its victims by the hundreds and even thousands, goes back less than 40 years and is traceable to a series of outbreaks in the Scandinavian countries of northwestern Europe, whence about the year 1906 a general migration began which has since brought the entire world under its baneful influence. So far as the United States is concerned, the epidemic began on a scale large enough to attract attention in 1907, and—as the present unhappy events testify all too certainly—it has not yet wholly abated.

The world epidemic or pandemic of poliomyelitis just referred to led to the successful transmission of the disease from man to monkey, to which event we owe the precise knowledge of the inciting agent or microbe of the disease and of the mode of infection or its communication, and many other important facts concerning the nature of the disease. The first experimental production of poliomyelitis was accomplished in 1909, since which time knowledge has grown with leaps and bounds, so that far from being, as it were, mysterious, it may be said that the pathology—using that term in its wide sense—of few diseases is so well understood as that of poliomyelitis.

The first successful experiments were performed by Landsteiner, of Vienna, who introduced a bit of the central nervous tissues of a fatal case of poliomyelitis into the peritoneal cavity of a monkey. After an incubation period of a week or so, the inoculated animal felt ill, developed paralysis, and died, and at autopsy showed lesions of the spinal cord and medulla which essentially were indistinguishable from those occurring in human cases. Although Landsteiner failed in his effort to transmit the disease from monkey to monkey, because he continued to employ the intraperitoneal mode of inoculation, Dr. Lewis and I quickly found that continuous transfer could be secured by the intracerebral inoculation carried out in the manner of the rabies inoculations.

The possession of a method of regularly inducing experimental poliomyelitis in the monkey settled once and for all the infectious or microbic nature of the human malady and made possible the determination of the manner in which the inciting or microbic agent sought to gain entrance into the body. This is in itself a fact of obvious capital importance, because any attack on the disease having as its object the prevention of its extension must be based upon accurate knowledge of the way in which infection occurs. Until that is known the fight against such spread must be carried on in the dark.

Two ways of proceeding were at hand. Materials taken from various portions of the infected human body could be introduced into monkeys in the hope that one or another would show the presence of the microbic incitant. Since this incitant had early been shown by us to belong to the filter-passing viruses, it was, of course, possible to work in this way with highly contaminated material, such as the secretions of the nose and throat and the intestines. All that was needed was to filter these materials in a proper manner through earthenware filters to obtain a clear, ordinary bacteria-free fluid for purposes of inoculation.

This simple method proved unpromising and was indeed not used at once but was deferred in favor of the second method, which I shall describe immediately, and which it was hoped woud yield more certain resuts. It was desirable to employ for inoculation a virus which had become adapted to the monkey by successive transfers from animal to animal. As it is obtained immediately from man, the virus has not a high degree of activity or infectivity for the monkey, but after adaptation its activity is very great and practically every inoculated monkey develops paralysis. Instead, therefore, of seeking at first to detect the way in which the virus enters the human body, it seemed wiser to discover how it left the monkey's body. It is, of course, obvious that with a disease such as poliomyelitis, in which the localization and multiplication of the microbe is in the interor of the central nervous system, a well-defined device must exist to enable the microbe to leave one body to enter another and thus escape extinction. Every microorganism which induces disease must perfect some such mechanism. We already know of the employment of many shifts, including bloodsucking insects, to insure this perpetuation. The method of inoculating the virus directly into the brain of the monkey through a minute trephine opening in the skull which could be sealed, afforded an opportunity to discover how the virus would seek to reach the outside in this animal.

The answer to the question was quickly secured. The various organs, fluids, and secretions of the body were examined by removing them from the infected and paralyzed animal, and when needed, purifying them from ordinary bacteria by filtration, and inoculating them intracerebrally into healthy monkeys. The blood and organs generally (except, of course, the nervous tissues) were found to be devoid of the virus; the secretions and dejecta also were devoid of it, except in the case of the mucous membranes of the nose and throat and their secretions, which contained it.

This answer, which was unequivocal, was highly important. The absence of the virus from the blood and the organs in most intimate relation to the blood, seemed to dispose of that fluid as directly concerned in the mode of transmission. With this went the likelihood of some intermediate agent of transfer of the virus, such as a biting insect. But of course the absence of the virus from the blood of the monkey did not necessarily prove that it was absent also from the blood in man. An extensive search for the virus in human blood was made by removing and injecting into monkeys the blood taken at many stages of the disease in all its manifold clinical forms. No successful transmission

was ever secured in this way, and other investigators who attempted the transmission with blood also uniformly failed.

Not so, however, with the nasopharyngeal secretions taken from human cases. Once the escape of the virus in these secretions was determined, attention was directed to them in man, and in fatal cases to the nasal and pharyngeal mucous membranes also; both were found to harbor the virus.

The conclusion, therefore, seemed unescapable that both in man and in the monkey the nasal and pharyngeal mucous membranes played a part as eliminators of the virus. Did they play the part of introducers as well?

The direct experiment to determine this point could be made in the monkey. The virus could be brought directly into contact with the nasal mucous membrane and the result observed. The experiment not only succeeds, but experience has shown that, next to direct implantation of the virus in the brain, bringing it into intimate contact with the nasal membranes is the surest way to induce infection, paralysis, and often death in that animal. Hence we know that not only does the virus seek to escape from the body by way of the nasopharynx, but it may also enter the brain through that channel.

For man, also, there is strong evidence that the nasopharynx serves as portal of entry of the virus. A number of instances is now on record which shows incontestably that healthy persons ("carriers" as we now call them) in contact with cases of poliomyelitis harbor the virus in their nasopharyngeal secretions. The proof of this fact is based on experiments in which the filtered secretions of such persons inoculated into monkeys have induced paralysis, etc., and the brain and spinal cord have shown the characteristic microscopic lesions of poliomyelitis.

A corollary to these findings is that of the difficulty of inducing infection of the monkey even with the highly active adapted virus injected directly into the blood. Such attempts always fail unless enormous doses are given, and even then tend to fail unless the brain and its meninges of the monkey have been subjected to measures which increase the permeability of the choroid plexus and perhaps injure still other structures. In other words, the virus takes the shortest route both to and from the central nervous organs, and that route is by way of the lymphatic communications existing between the subarachnoid space and the nasal and pharyngeal mucous membranes.

In this brief outline I have tried to give the experimental and other bases for our belief in the personal communication of the virus of poliomyelitis by way of the nasopharyngeal secretions. The efforts of physicians and health officers to protect persons from this dread disease must be based upon knowledge of its nature and mode of communication. The views which I have presented of these conditions suggest a line of practical action, with the details of which you are already familiar. It remains for me to add that as poliomyelitis is a general disease of infectious origin which appears in mild as well as in severe and even fatal forms, it is the cases of the first especially, rather than the last, which constitutes the greater menace to the public health. It is true also that healthy "carriers" of the poliomyelitis virus arise, but present knowledge does not permit us to attribute a dominant part in its distribution to them. And, finally, I may state that a far larger number of nonparalytic than paralytic cases of the disease occurs in any given epidemic and that even the paralytic cases recover in part, if not in large part or altogether, either early or eventually. It is highly desirable to bear in mind the salient points of the natural history of the disease in order that you—and more particularly the patients and their family and friends—should not be misled by the extravagant claims made for methods of treatment not warranted by the facts and of which some are merely fantastic.

REPORT OF AN OUTBREAK OF DIPHTHERIA ON THE U. S. S. "NEW MEXICO."

By R. E. Stoops, Commander, Medical Corps, United States Navy.

Three cases of diphtheria occurred on the *New Mexico* during the month of October, 1921, the first case being admitted to the sick list on October 6. At the time of admission the clinical appearance was that of an acute follicular tonsillitis and continued so on the second day. On October 8, a membrane had developed on the tonsils and pillars of the fauces, when diphtheria was suspected. Smears which were taken from the throat, when stained, showed an occasional bipolar bacillus. The patient was transferred this date to the hospital ship *Mercy*, where cultures were positive for the Klebs-Loeffler bacillus. The second case was admitted to the sick list October 9, and transferred to the hospital ship the same day, the clinical appearance and diagnosis in this case being tonsillitis acute follicular. However, cultures which were made on the hospital ship were positive for the Klebs-Loeffler bacillus and the diagnosis was changed to diphtheria. The third case was admitted to the sick list and transferred to the hospital ship on October 15. The throat of this patient presented a definite membrane on the right tonsil and was therefore diagnosed as diphtheria. A stained throat smear showed typical bipolar bacilli. Cultures taken on the hospital ship were positive.

The first case, which was admitted on October 6, was considered to have been accidentally infected while ashore, and the second as a mere coincidence. With the appearance of the third case on October 15 we were forced to the conclusion that an epidemic of diphtheria was imminent.

The relation of these cases, one to the other, and to the ship as a whole, is shown in Table 1. Referring to this table it will be seen that contact, other than the most casual, between the cases can be eliminated as the persons affected ate at different messes, slept in different compartments, and worked in different parts of the ship.

TABLE NO. 1.

Case.	Division.	Mess No.	Working billet.	Location of hammock.
No. 1, O. F. B., sea. 1c.....	Tenth.....	N4	Battle radio station...	Compartment D327.
No. 2, O. H. B., sea. 1c.....	Third.....	33	Motor boat No. 2.....	Boat No. 2.
No. 3, P. W. J., mus. 1c....	Fifteenth.....	R4	Ship's band.....	Compartment A418.

A detailed chronological description of the method of handling the situation will be given, not with the thought that the various steps taken were ideal or even right and timely but to present what appeared to be the best method of procedure under the circum-

stances, giving due consideration to the fact that the *New Mexico* was in the midst of her target practice and anything tending to interfere with the ship's schedule was not to be advocated unless considered imperative.

The various incidents were as follows:

October 6, 1921: Case No. 1, O. F. B., seaman, first class, was admitted to the sick list with a diagnosis of acute follicular tonsillitis.

October 8, 1921: O. F. B. was suspected of having diphtheria and transferred to the hospital ship, where the diagnosis was confirmed by laboratory findings.

October 9, 1921: A report was received from the hospital ship that both the smear and culture of case No. 1 were positive for bacillus diphtheriæ. The contacts of this case were put on a daily examination list. Throat cultures were made of 10 or 12 close contacts, with negative results. All suspicious cases of sore throat were isolated and cultured. The sterilization of the mess gear in the scullery was checked and the scullery complement acquainted with the situation. Case No. 2, O. H. B., seaman, first class, was admitted to the sick list with a clinical diagnosis of acute follicular tonsillitis and immediately transferred to the hospital ship.

October 10, 1921: A signal was received from the hospital ship, which stated that case No. 2 had diphtheria. All men who had been in contact with this case were put on the daily inspection list.

October 11, 1921: In accordance with the medical officer's recommendation, the executive officer detailed a watch to wash the scuttle butt tips, bowls, and handles with a 5 per cent solution of formalin each time they were used.

October 12, 1921: No special activity except the inspection of contacts.

October 13, 1921: A case, clinically resembling diphtheria, was admitted to the sick list and transferred to the hospital ship. After a consultation with the fleet surgeon and the chief of the medical service of the hospital ship *Mercy*, it was decided to Schick test all contacts immmediately and the entire crew eventually. The hospital ship supplied Schick material sufficient for 170 tests, which was all that was immediately available in the fleet. Two medical officers and 12 hospital corpsmen were given Schick tests this date.

October 14, 1921: Administered Schick tests to 4 officers and 48 enlisted men. A report was received from the hospital ship that the laboratory findings were negative in the case transferred October 13.

October 15, 1921: Case No. 3, P. W. J., musician first class, was admitted to the sick list with diphtheria. This patient had a membrane on the right tonsil when first seen and a throat smear showed typical bipolar staining bacilli. He was given 15,000 units of diph-

theria antitoxin and transferred to the hospital ship. Two other suspicious throat cases were admitted to the sick list, one having been taken ill ashore and transferred directly to the hospital ship by the shore patrol, and the other admitted on board and transferred to the hospital ship October 16. In each case the final diagnosis was tonsillitis. The third division, in which case No. 3 occurred, was given instruction on the subject of diphtheria and the throat of each person examined. The mess cooks were instructed in the care of the mess gear. Sufficient material for 1,300 Schick tests and 200,000 units of diphtheria antitoxin were ordered by radio from the naval medical supply depot, Mare Island, Calif. The two days' delay in ordering this material was occasioned by a discussion as to whether the hospital ship should procure sufficient Schick test material and diphtheria antitoxin for several ships and issue it as required or whether each ship should order directly from the supply depot and be self-supporting. It was decided that it would be more economical for the hospital ship to procure the material, and this method was thereafter adopted.

October 16, 1921: Twenty-three men were given the Schick test. The daily inspection of contacts was discontinued as the list was becoming very large and unwieldy.

October 17, 1921: All officers not heretofore inoculated were given Schick test this date. Two hundred thousand units of diphtheria antitoxin were received. One thousand units diphtheria antitoxin as an immunizing dose were given to each person showing a positive Schick test. The divisional officers published to their divisions a notice describing the disease, the manner of transmission, and an admonition to report to the sick bay day or night if a sore throat or illness developed.

October 18, 1921: Schick material for 500 tests was received from the hospital ship. A few immunizing doses of diphtheria antitoxin were given to persons showing positive Schick reactions.

October 19, 1921: Material for 350 Schick tests was received from the supply depot, Mare Island, Calif. There was now on hand material for 910 Schick tests and 193,000 units diphtheria antitoxin.

October 20, 1921: Having procured sufficient material, 969 of the crew were given Schick tests. All officers giving positive Schick reactions were immunized with diphtheria antitoxin.

October 21–23, 1921, inclusive: No special preventive measures carried on.

October 24, 1921: The Schick tests given October 20 were checked and recorded. Schick tests were given to a few stragglers. Discontinued the administration of immunizing doses of diphtheria antitoxin. The last case of diphtheria occurred October 15.

October 29, 1921: The scuttle butt watch was discontinued, and in its place it was recommended that the scuttle butt fountains be washed with soap and water three times a day. It was considered that the incipient epidemic ended this date.

The scuttle butt installation is of the standard Navy type. While it is problematical as to the approximate amount of sputumborne diseases transferred through this agency, nevertheless, in the endeavor to eradicate all possible sources of transmission, the scuttle butt fell into disrepute. Flaming the working parts or washing them with an antiseptic at intervals during the 24 hours did not appear to meet the requirements, as contamination might occur after one or several uses of the fixtures. Sterilization each time after the use of the scuttle butt appeared most logical and this was, in the opinion of the writer, satisfactorily accomplished by washing the fountain tips and handles with a 5 per cent formalin solution after each man had finished drinking. For hand protection, the men on the scuttle butt washing detail were supplied with surgical rubber gloves. On the second day, however, it was reported that they had worn out 24 pairs of gloves. After this they were provided with heavy duty electrician's gloves procured from the supply department.

The 969 Schick tests administered to the crew October 20 were completed, except for a few stragglers, between the hours of 2.30 and 4.30 p. m. Two operating groups were formed, one on each side of the crew's reception room, and the men were passed to one or the other of these groups. The fleet surgeon and the dental officer of the ship volunteered to assist the two medical officers in giving the injections. Although there was apparent material for only 910 Schick tests on board, it was found that the contents of the ampules were sufficient for the 969 inoculations. The resulting reactions of all the tests were as follows:

Number of Schick tests given	1,199	Per cent 2 plus	10.1
Per cent positive	31	Per cent 3 plus	2.8
Per cent 1 plus	16.8	Per cent 4 plus	1.3

A few controls were made in selected cases. Controls were not generally made because there appeared to be a dearth of Schick test material on the west coast at that time.

The inspections of the contacts failed to reveal any suspicious cases. No general inspections of the crew were made for the reason that it was considered that such inspections would entail effort out of all proportion to the possible benefit to be derived. General throat culturing was not undertaken for the same reason. Toxin-antitoxin immunization was not done because it requires several months for immunity to develop after such treatment and the object was not the production of immunity several months hence but the

immediate control of the epidemic. Moreover, the view is held that if it is desirable to thus immunize against diphtheria, this should be accomplished at the training stations along with the other immunizations now practiced.

Aside from general sanitary measures, the plan as finally adopted was, first, to induce the sick to report early for treatment in order that we might promptly isolate suspicious cases; second, to determine the positive or negative Schick reactions of the personnel; and, third, to administer 1,000 units of diphtheria antitoxin to each person giving a positive Schick reaction. The third phase was not carried out to any considerable extent on account of the early termination of the epidemic. Only 37 immunizing doses of diphtheria antitoxin were given.

HEALTH CONDITIONS IN THE NAVY.

Had it not been for influenza, the morbidity rate for all causes, entire Navy, for the period covered by this report, i. e., February 11 to March 4, would have been 588 per 1,000 per annum, as compared with a rate of 850 for a similar period last year. The effects of influenza caused the morbidity rate for all causes to be 866.4 per 1,000 per annum. The admission rate for all causes, entire Navy, for the portion of the year 1922 already passed, is now 740 per 1,000 per annum, as compared with 830 per 1,000 per annum at a similar time last year. From this it can be seen that even though influenza has had a considerable effect upon the morbidity rates, it may be predicted that the final rates for the Navy for the present year will be much lower than for the previous year. The high rates of last year, it should be remembered, were largely due to mumps, measles, and other communicable diseases among recruits. During the coming year it is not expected that the Navy will induct into the service large numbers of recruits over a short period of time, as was done during the fall and winter of 1920–21. Consequently, this factor should not have any material effect upon the final rates for this year.

There have been very few communicable diseases other than influenza in the Navy during the past month, with the possible exception of malaria, which continues to be higher than normal. As soon as all data concerning the recent epidemic of influenza is received in the bureau a complete summary of the epidemic will be given, probably in the May Bulletin. By reference to Tables Nos. 1 and the prevalence of influenza on individual ships and at shore stations may be noted. Reference to the table following will show the prevalence of individual communicable diseases:

Annual admission rates per 1,000 for certain communicable diseases, current months of February, 1922, in comparison with the mean annual admission rates, month of February, for the four-year period 1918–1921, inclusive.

	February, 1918–1921.	February, 1922.
Cerebrospinal fever	0.36	0.08
Diphtheria	.71	.49
German measles	1.25	.65
Influenza	38.31	278.02
Malaria	2.32	18.22
Measles	3.33	.40
Mumps	16.70	1.62
Pneumonia	3.71	3.81
Poliomyelitis	.003	0
Scarlet fever	1.06	.65
Smallpox	.06	0
Tuberculosis	1.67	2.59
Typhoid fever	.04	.08

Although a mild epidemic of influenza has been present, it is noteworthy that the morbidity and mortality rates for pneumonia are not much higher than may ordinarily be expected at this time of the year.

The venereal disease rate for the entire Navy is somewhat lower than at a similar period last year. This is due, no doubt, to the fact that the Atlantic and Pacific Fleets, as a whole, did not make a visit to any foreign country, as was done last year. when the rates showed a considerable increase about this time.

THE TREATMENT OF CARBON MONOXIDE POISONING.

The following is quoted from the Health News, issued by the United States Public Health Service in February, 1922:

Carbon monoxide poisoning is one of the most widely distributed and most frequent of industrial accidents, says the U. S. Public Health service. The gas is without color, odor, or taste. It is an ever-present danger about blast and coke furnaces and foundries. It may be found in a building having a leaky furnace or chimney or a gas stove without flue connection, such as a tenement, tailor shop, or boarding house. The exhaust gases of gasoline automobiles contain from 4 to 12 per cent of carbon monoxide, and in closed garages men are not infrequently found dead beside a running motor. A similar danger may arise from gasoline engines in launches. The gas is formed also in stoke rooms, in gun turrets on battleships, in petroleum refineries, and in the Leblanc soda process in cement and brick plants. In underground work it may appear as the result of shot firing, mine explosions, or mine fires, or in tunnels from automobile exhausts, or from coal or oil burning locomotives.

Carbon monoxide exerts its extremely dangerous action on the body by displacing oxygen from its combination with hemoglobin, the coloring matter of the blood which normally absorbs oxygen from the air in the lungs and delivers it to the different tissues of the body.

Oxygen will replace carbon monoxide in combination with hemoglobin whenever the proportion of oxygen in the lungs is overwhelmingly greater. Therefore:

1. Administer oxygen as quickly as possible, and in as pure form as is obtainable, preferably from a cylinder of oxygen through an inhaler mask.
2. Remove patient from atmosphere containing carbon monoxide.
3. If breathing is feeble, at once start artificial respiration by the prone posture method.
4. Keep the victim flat, quiet, and warm.
5. Afterwards give plenty of rest.

NEW ORGANISM AKIN TO BOTULINUS.

The following is quoted from the Health News, issued by the United States Public Health Service in February, 1922:

The existence, says the Public Health Service, in a recent report by Ida A. Bengston, has been demonstrated of an anærobic organism producing a soluble toxin which affects animals in a manner similar to that of the botulism organism, but which fails to be neutralized by polyvalent botulinus antitoxin. Study of the organism, as found in the larvæ of the green fly *Lucilia cæsar* sent to the service, indicate that it differs markedly from the botulinus isolated in the United States, and possibly is more nearly related to the European type described by von Ermengem in 1912, though it differs from this in important respects. Tests on laboratory animals by inoculation and by feeding caused death in from 4 to 71 hours. The most striking pathological result was, as in botulism, the congestion of the blood vessels of the brain and meninges. Efforts are being made to produce an antitoxin. The suggestion that the organism of the disease causes limberneck in chickens has not yet been demonstrated.

LABORATORY WORKERS CONTRACT TULARÆMIA.

The following is quoted from the Health News, issued by the United States Public Health Service in February, 1922:

All six of the laboratory workers of the U. S. Public Health Service who have been studying tularæmia, a disabling sickness of man which has been known, particularly in Utah, for the last five years, have contracted the disease, two of them being infected in the laboratory in Utah and the other four in the Hygienic Laboratory in Washington. Such a record of morbidity among investigators of a disease is probably unique in the history of experimental medicine.

Two of these workers are physicians; one is a highly trained scientist; and the others are experienced laboratory assistants. One of them contracted the disease twice, once in the laboratory in Utah and again, two years and five months later, in the laboratory in Washington.

In these workers the disease began with a high fever, lasting about three weeks, and was followed by two months of convalescence. The disease has few fatalities, its chief interest arising from the long period of illness which it causes in midsummer, when the farmers of Utah are busily engaged in cutting alfalfa and plowing sugar beets.

The studies into the cause and transmission of the disease show it to be due to a germ, *Bacterium tularense*, which is conveyed by six different insects; the blood-sucking fly, *Chyrsops distalis;* the stable fly, *Stomyox calcitrans;* the bedbug, *Cimex lectularius;* the squirrel flea, *Ceratophyllus acutus;* the rabbit louse, *Haemodipsus ventricosus;* and the mouse louse, *Polyplax serratus.* Only the first four of these are known to bite man. It appears possible that the germ may also enter through unbroken skin; for instance, that of the hands.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "NORTH DAKOTA," FOR THE YEAR 1921.

Influenza.—A rather extensive, but mild, epidemic of influenza occurred during February and March, 1921, while the ship was in Guantanamo Bay, Cuba. Practically all cases were treated on the ship. As the weather was pleasant and the sick bay crowded, through the cooperation of the commanding and executive officers, the forecastle was used for the overflow of patients from the sick bay. There were no serious cases.

Food poisoning.—On October 29, 1921, an extensive and rather serious outbreak of food poisoning occurred. This outbreak was made the subject of a special report to the Bureau of Medicine and Surgery by the senior medical officer of the ship and a board of investigation was ordered by the commander, Battleship Force. (Report appeared in Bulletin No. 112, Notes on Preventive Medicine for Medical Officers, United States Navy.)

Tonsillitis.—Whenever sudden changes of weather occurred, particularly seasonal changes, from winter to spring and from fall to winter, quite a few cases of this disease developed. At no time were there a sufficient number of cases for this disease to be considered as having occurred in an epidemic form.

Cellulitis.—The sailor seems particularly prone to develop infections coming under this head. This is believed to be due to the frequent minor injuries and bruises which are not reported until after they have become infected; too close personal contact and crowding on board the modern man-of-war; and to the restrictions in the use of fresh water and the ofttimes irritating effect of salt water on the skin, both from direct use in bathing and from its use in washing clothes. There were 28 admissions with this diagnosis during the year, with 128 sick days.

Ship's sanitary regulations.—A complete set of sanitary regulations, compiled by a former senior medical officer of the ship, are now incorporated in the ship's regulations.

Venereal disease.—The percentage of venereal disease has been very low. The following measures are carried out on this ship and may or may not have something to do with this low percentage. Lectures have been given to practically all of the crew in regard to venereal prophylaxis and venereal disease. Pamphlets on venereal disease, furnished by the Navy Department, have been distributed to the crew, and warning posters have been displayed and frequently changed on the bulletin boards. The venereal treatment and prophylaxis room, in charge of a hospital corpsman, is kept available at all times for prophylaxis.

Vaccinations.—At the start of each period of cruising all health records have been examined and vaccination against smallpox and inoculation against typhoid and paratyphoid fevers have been administered to all men whose records showed that they had not been properly protected.

Bedbugs.—According to data on file in the Medical Department, bedbugs have een present on this ship since the ship was in Vera Cruz, Mexico, during 914. At this writing, there are very few on board. This is believed to be ue to the systematic campaign carried out by the first lieutenant and the enior medical officer against this pest. The first lieutenant, after consultation ith the senior medical officer, issued the following order which was rigidly arried out in detail over a period of two months, and is still being carried ut whenever considered necessary.

ORDER.

At sea, 15 June, 1921.

1. The following sanitary orders will be in effect until further orders:

(*a*) Schedule for pest exterminator. Apparatus will be obtained from the ispensary, which will keep on hand and issue necessary charging fluid.

Monday: All deck force hammock nettings, when bedding is aired. Each ivision will be in charge of the work being done in its own nettings, under eneral charge of the mate of the deck and chief master at arms. This work ust be completed before noon.

Tuesday: Junior officers' quarters, W. O. quarters, and D–112. Caterer of esses in charge, assisted by mess attendants. All mattresses and springs be taken on top side and aired, bunks and behind and beneath drawers rayed. Mattresses will be carefully sprayed and springs torched.

Wednesday: C. P. O. and laundry. C. P. O. under caterer, and laundry nder mate of the deck. Same procedure as for other officers' quarters.

Thursday: All engineers' hammock nettings when bedding is aired. Under ngineers' master at arms. Same procedure as for Monday.

Friday: Ward room, cabin, and chart house. Under first lieutenant and ief quartermaster. Same procedure as other officers' quarters.

(*b*) Decks will be swabbed with disinfectant on Monday and Thursday. his will be drawn from the dispensary and will be put on only after decks ave been scrubbed clean.

Rats.—The *North Dakota* is one of the older ships, and during her time in e navy yards numerous rats have unquestionably come on board and have ultiplied. Fortunately the storerooms are particularly free from these pests, e greatest number being found on the gun and berth decks. The following ecommendations have been made and are, in the main, being carried out:

(*a*) That all slop buckets in pantries and galleys be emptied and cleaned t before the watch boy leaves at night.

(b) That all food in pantries and galleys be kept in rat-proof containers or mpartments.

(*c*) That rat holes be stopped up when found. In this connection, the issuing om and laundry on the gun deck, where many rats used to be seen, have been ndered practically rat proof within the past three months.

(*d*) That a supply of guillotine rat traps be obtained and issued for use to sponsible men in charge of localities where rats have been seen.

Structural details of the ship and their sanitary aspects.—According to state- ents in the last two sanitary reports, a complete comment on the structural tails of the ship in their sanitary aspects has been made in sanitary reports revious to 1919. In this connection, however, a few matters seem worthy of mphasis and repetition. The *North Dakota* was originally designed for a com- lement of about 950 men. The requirements of modern gunnery necessitate much larger complement, with consequent overcrowding of living spaces, which, turn, increases the normally close contact of man to man on board ship and

thus makes for insanitary living conditions. In addition, on this type of ship the gun and berth decks are largely arranged into small compartments, thus hindering somewhat a free circulation of air, especially as some of these compartments have no forced ventilation. In one sense these small compartments make for increased contentment, as in many instances one division may have an entire compartment assigned them, which gives a more homelike environment. They then take pride in their compartment and keep it in excellent condition. During even moderately rough weather there is some leaking of water through the 5-inch gun shutters of the gun deck on the weather side; this makes a damp, unpleasant condition in these living spaces. Increased complement has also made messing arrangements more difficult, hammock stowage less convenient, increased the ratio of personnel to toilet facilities, and also rendered the capacity of the cold storage insufficient for very extensive cruising away from base of supplies.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "NEVADA," FOR THE YEAR 1921.

The health in general of the ship's company during the past year has been excellent. Early in January the *Nevada* sailed with the Atlantic Fleet battleships for the winter cruise in southern waters, having on board an excess of nearly 300 men over the normal complement. Many of these individuals reported on the ship directly from training stations shortly before sailing, and, in consequence of their unseasoned physical condition, together with the attendant overcrowding, admissions to the sick list for such ailments as mumps, measles, and follicular tonsillitis were more than might ordinarily be expected. However, in the course of the following two months, after these men had benefited by the well-regulated life and routine afloat, an average low sick rate was attained and has continued to the present time. There has been no prevalence of any contagious disease, although for several weeks frequent cases of mumps developed from infection brought aboard ship by drafts of recruits from training stations.

Hospital ships have been utilized for serious medical and surgical patients whenever these vessels have been available. The percentage of sick for the year was 0.23.

Owing to the widespread distribution of smallpox in both the United States and West Indies throughout the winter months, much care was exercised in vaccination of all drafts as well as those already on board, particularly those whose health record entries or vaccination scars were unsatisfactory. The excellent quality of the virus obtained in the Panama Canal Zone in February accounts in part for the high percentage of positive results in men who had previously been vaccinated. There has recently been a decided improvement in the thoroughness of vaccination of recruits as shown by those received from shore stations. The health records of these men are also more complete and apparently greater care has been given to their preparation.

A new and larger dish-washing machine is badly needed. The equipment now installed is old and too small. As the source of most throat infections developing aboard ship is from contaminated mess gear, the importance of the sterilization of all dishes and eating utensils being thorough has been duly impressed on all hands detailed in the scullery. Daily inspection of mess cooks and the galley force by the medical officers has been productive of good results in bettering the appearance and cleanliness of those assigned to this work.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "ARIZONA," FOR THE YEAR 1921.

The health of the personnel for the year was very good, and there were no deaths on board for either disease or injury. The number of original admissions for all causes was 290 less than the previous year, and the total number of sick days was 1,396 less than for the year 1920. The diseases causing the greatest damage in sick days were as follows: Venereal disease (combined), 93 admissions with 341 sick days; bronchitis, acute, 74 admissions with 332 sick days; tonsillitis, acute follicular, 62 admissions with 248 sick days. There were 18 admissions for mumps during the year; this disease was introduced on board during 1920 and the infection continued with sporadic cases until May, 1921, when the last case for the year developed. One case of chicken pox developed, apparently from exposure in New York; he was promptly isolated and no further cases appeared. One man who had been exposed to measles while on leave was isolated upon his return to the ship; no cases developed. There were five sporadic cases of lobar pneumonia, all due to exposure while on duty.

The usual preventive measures of washing down decks with 2 per cent cresol solution, flaming scuttle butts or washing them with formaldehyde, isolation and transferring contagious cases to the hospital, and boiling mess gear were practiced. Cooks, bakers, mess attendants, and stewards have been examined weekly for venereal disease.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "FLORIDA," FOR THE YEAR 1921.

While the ship was in Boston during the months of November and December, acute follicular tonsillitis was quite prevalent, due to climatic conditions and the ease with which this disease is transmitted. A new dish-washing machine was being installed at the time, and hand washing had to be resorted to; this might have been a contributory factor.

About 60 per cent of the venereal infections occurred in January, the ship having been in South American ports during the latter part of December and the early part of January.

The absence of the incidence of the pneumonias while the ship was in Boston during cold weather is noteworthy.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "BIRMINGHAM," FOR THE YEAR 1921.

The high percentage of venereal cases during 1921 is believed to be due to itinerary of the ship. The environment of the personnel while on shore leave in South American ports, despite precautions and repeated warnings by medical officers, was the principal factor of infection.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "CALIFORNIA," FOR THE YEAR 1921.

There has been an almost entire absence of communicable diseases since the ship was commissioned, which may probably be attributed to the close observation of the men in camp for one month before commissioning and the strenuous efforts on the part of the first lieutenant to keep the living spaces clean.

The venereal disease rate has been high. More than 50 per cent of the cases were admitted during the first six weeks the ship was in commission and were contracted at San Francisco, Calif. The monthly admissions for gonorrhea were: August, 12; September, 22; October, 8; November, 10; December, 9.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, SQUADRON EIGHT, ATLANTIC FLEET, FOR THE YEAR 1921.

The facilities for giving venereal prophylaxis are more than ample, but the methods are inadequate. It is thought that the procedure now practiced is repugnant to a large number of the newer men in the service; these men are reluctant to use the prophylactic stations, partly due to natural timidity and partly to the fact that they do not desire a report made of their illicit intercourse. They are taught that such conduct is a sign of moral weakness. It is also a well-known characteristic of the American sailor to take a chance where the facilities for venereal prophylaxis are not convenient. It is thought that if a method were provided for the taking of prophylaxis in privacy at the time of exposure that many men would take advantage of such protection. No evidence has been adduced to indicate that the possession of a venereal prophylactic packet would materially increase the number of exposures. It is believed that the authorized use of packets would lower the now high percentage of venereal disease to a marked degree inasmuch as the time elapsing between exposure and prophylaxis would be cut to a minimum. Records show that where prophylaxis is taken within an hour of exposure that it is 99 per cent effective.[1]

It is recommended that a venereal prophylactic packet be provided the service, which may be furnished to the men going on liberty or on leave; and, furthermore, that disciplinary action be taken toward men failing to comply with the instructions for venereal prophylaxis.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL ACADEMY, ANNAPOLIS, MD., FOR THE YEAR 1921.

The only epidemics occurring during the year were measles and chicken pox, which occurred among the children of officers attached to the Naval Academy. Measles occurred in March, and was extensively spread by a child in the preeruptive stage of the disease attending the yard school. The early cases were mild in type; the later cases unusually severe. Sporadic cases of chicken pox occurred from time to time in the winter months, and in October the number reached epidemic proportions.

Two cases of infantile paralysis occurred during August in the families of officers.

One case of cerebrospinal meningitis was removed to the naval hospital, Annapolis, from the tug *Chemung*. The tug was placed in quarantine and the living quarters were cleaned and disinfected. Recommendation was made to remedy the overcrowded condition of the berthing spaces.

[1] This is not in accord with data obtained from the questionnaires or Form A. From these sources it appears that disease will follow in 2 cases out of every 100 prophylactic treatments taken within one hour after exposure, and that only about 4 cases will follow 100 exposures when no prophylaxis is taken.

During the year there were a few sporadic cases of mumps, scarlet fever, diphtheria, and whooping cough. Through the winter months there was a very mild epidemic of influenza among officers' families and the midshipmen. During the week of April 4–11 there were 12 cases of acute cholangitis among the midshipmen, which were believed to be of the epidemic type. An analysis of these cases by Lieut. David Ferguson, Medical Corps, U. S. Navy, was made the subject of a special report.

As a result of routine examinations of the stools of the Filipino mess attendants sent to the *Cumberland*, 14 cases of hookworm were found and transferred to hospital for further treatment.

From time to time there have been slight outbreaks of enteritis among the midshipmen, usually traced to dietetic indiscretions while on liberty. The ration has been well balanced and the food has been well cooked, served hot, and liberal in quantity. The milk from the Naval Academy dairy has been maintained at a high standard.

Eleven cases of scabies occurred since the beginning of the academic year 1921. All cases were transferred to hospital, and their effects, including bedding, were sterilized with steam. Not a single case occurred in a roommate or from known contact at this institution. In six cases there was a definite history of "itch" existing in other members of the midshipmen's family or household at home. Apparently all cases among the midshipmen were contracted while on leave or, in the case of fourth classmen, before admission to the academy. From this experience and from reviewing recent literature, it is believed that scabies is becoming more common in this country, probably as a result of conditions incident to the war.

There were 285 cases of ringworm treated during the year. This disease continues to be endemic at the academy in spite of all efforts to eradicate it. The means used to combat it include sterilization of jockey straps and gymnasium athletic gear; sterilization of all effects of ringworm patients before they are sent to the laundry; sterilization of all toilet seats twice daily with 5 per cent formalin solution; inspections, especially of the entering class which furnishes the greater number of cases; careful supervision of the treatment of infected cases; and weekly inspections by medical officers to determine which cases are ready for discharge.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES MARINE BARRACKS, QUANTICO, VA., FOR THE YEAR 1921.

Despite the fact that the complement was more than double that of the previous year, communicable diseases, with the exception of influenza and malaria, did not increase in proportion. Most of the latter were of tropical origin, but, unfortunately, malaria developed in some men who had never seen tropical service. Each case upon admission was carefully investigated and it was found that nearly all malarial infections of local origin occurred in men attached to the flying field. This circumstance is explainable by the close proximity of Chappawamsic Creek to the flying field, where anopheles breed in abundance.

As soon as it was determined that malaria could be attributed to this factor, immediate steps were taken to combat the disease. All the barracks buildings were fumigated with sulphur dioxide; the screening was carefully inspected and repaired; the men on night duty provided with gloves and mosquito veils, and all cases transferred to sick quarters for isolation and treatment. No attempt was made to control the situation on the creek itself, because of its

vast extent, lack of sufficient labor, and the great expense it would involve, with little hope of accomplishing anything.

Two cases of poliomyelitis, acute anterior, developed during the months of June and July; one, an officer attached to the station, the other, a colored girl, 11 years old, in the town of Quantico. As far as could be learned after careful investigation, there was no connection between the two cases; neither had come in contact with the other in any way. The officer died within a few days and the girl recovered. Quarantine was established in each case. The nose and throat of each school child was sprayed with peroxide of hydrogen. No other cases developed.

The influenza cases were scattered over a period of five months and were not unusually excessive in a complement of this size.

The source of water supply and process of treating the water were very thoroughly covered in last year's report, so no attempt will be made to repeat this. A description of the successful work of the sanitation department in securing a water free from bacterial contamination seems more in order.

It is generally known that the stream from which the water supply is obtained has always been polluted. Heretofore, the mechanical filtration plant was considered capable of purifying the contaminated water, notwithstanding the fact that the only process used was mechanical filtration and chemical coagulation which is now not generally considered sufficient to produce a potable water. As it was impossible to change the source of supply it became necessary to concentrate efforts on the perfection of the plant. A general sanitary survey of the water supply and purification plant was begun. The first defect found was that the mouth of the overflow pipe of the sedimentation tank was higher than the upper edge of the baffle plates, permitting the water entering the tank to flow over the top of the plates into the overflow pipe, instead of being forced around the baffle as it should be. This was easily corrected by increasing the height of the baffle plates 12 inches.

The filter tubs were next examined and the beds in all four were found to be defective. This was probably caused by the disturbance of the gravel strata when the tanks were washed. The tubs were emptied, the filter beds rebuilt, and the underdrainage system removed, cleaned, and replaced. Since then no further trouble has occurred in this unit.

The wooden mains installed during the war were replaced during the year by 21,000 feet of 16-inch iron pipe, thus removing a possible source of contamination. These old pipes were leaking badly, and undoubtedly when the pressure was low a certain amount of surface water found its way through them into the supply system.

An unsuccessful attempt was made to flush the four storage tanks, each having a capacity of 200,000 gallons. They leaked so badly it was impossible to cause them to overflow. Something was accomplished, however, by forcing the water up to the leaks and letting it run through them for several hours. These tanks are not covered and while it is hardly possible that any trouble could arise from this source, nevertheless it would be better if covers were provided.

Although suspicion was not directed toward the 420,000-gallon storage reservoir on the hill overlooking the barracks, it was thought well to include it in the general survey. This was drained twice, the sides and floors were scrubbed and treated with live steam.

Early in the year when the water system in the area known as the shipyards was connected with the main system, the water was turned on without any attempt being made to flush out the old lines, most of which had been installed during the war and had been carrying water from a large storage tank

filled from wells proven to be contaminated. An occasional dash of Potomac River water also found its way into the system through a valve which controlled the supply used for steam boilers in an old power house. Ignorance on the part of the employees of the danger of polluting the whole system by tampering with this valve made it necessary to cut it out entirely. The same was also done with the storage-tank valve. These precautions closed the line against any possible outside contact.

The next step in the program was to cut off the supply at its connection with the main system, open all hydrants, and allow the water to run until the lines and blind ends were empty. The water was then turned on again and the mains were refilled. This procedure was repeated several times, and in this way the whole system received a thorough washing.

In spite of all these measures the water still showed contamination, and it was then decided that the only way a potable water could be secured would be by chlorination.

As the apparatus for this purpose had been installed when the plant was built, but for some inexplicable reason never used, it only remained necessary to determine the minimum amount of chlorine required to treat this particular water. After a little experimentation it was found that 0.16 parts of chlorine per million gallons would insure sterility during the summer months, and since the advent of colder weather the chlorine has been cut down without any deleterious effect.

While the filtration plant is now in perfect order, producing a water that can not be improved upon, a slight reduction might be made in the cost of operation by the addition of sodium carbonate in the raw water, thereby reducing the amount of aluminum sulphate now used. It would be necessary to employ a skilled operator, with some knowledge of water chemistry, to do this properly. The amount of money saved would scarcely equal the salary demanded by a man of that caliber.

The temporary water supply of the flying field is obtained from a basin formed by damming a small creek about a half mile away. The source of this creek is a spring, but before the creek reaches the dam it flows across a wagon road and spreads out over a considerable area, forming a fair-sized marsh and in this way becomes mixed with surface water. A small motor pump supplies the power necessary to force the water through a pipe line to a 10,000-gallon tank located in the camp. No means of treating this water is provided. An attempt was made to sterile the water in the tank by the use of calcium hypochlorite, but due to the fact that water was constantly being drawn off and sufficient time was not allowed for a thorough mixing of the stock solution this procedure was unsuccessful. Errors in technique also had some bearings on the failure of this method, and finally it was decided to resort to the use of Lyster bags to provide a safe drinking water.

This situation will be remedied within the next two or three weeks by the completion of a new 8-inch pipe line, 4,649 feet in length, extending from the end of Barnett Avenue to Chappawamsic Creek and from there across the new bridge to connect with the water system at the flying field ,supplying chlorinated water from the filtration plant.

In the month of October 20 cases of food poisoning occurred in one company. This outbreak was attributed to a meal consisting of bologna sausage, cheese, and potato salad. All cases were transferred to sick quarters, where they recovered without any lasting ill effects. The cheese and sausage were examined in the post laboratory with negative findings. Efforts were made to obtain a specimen of the potato salad, but it had been disposed of before any could be secured.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES MARINE BARRACKS, PARRIS ISLAND, S. C., FOR THE YEAR 1921.

The health of the personnel serving at this station has been excellent, largely due to the local climatic conditions. The mild, sunny weather which prevails during the winter months is directly responsible for the low admission rate for the respiratory infections. This is partly due to the fact that the weather itself does not predispose to bronchial and other respiratory disorders and partly to the fact that the absence of very low temperatures and raw penetrating winds does not drive the men, for the sake of warmth, to crowd themselves into small spaces with the windows and doors all closed, as frequently occurs in colder regions. There is, therefore, less opportunity for the dissemination of disease by the "droplet method." The men here are in the open air all day and practically all night as well, and their appearance shows the beneficial result of such conditions.

It is noted in Bulletin No. 105, Notes on Preventive Medicine for Medical Officers, United States Navy, that this station is given the lowest annual rate per 1,000 for admissions to the sick list from all causes among 12 training stations, camps, and other large shore stations having a complement of 1,000 or over for a period from January 2 to April 2, 1921, the months in which the greatest amount of sickness is to be expected at the different stations. This average rate for the marine barracks, Parris Island, was 387.30 per 1,000 per annum. It was also noted that in the Surgeon General's report that the average rate for the entire Navy for the year 1921 was 778.99 per 1,000 per annum. The fact that the annual rate for a station, used in training green recruits, susceptible to all the ills of that class of men, should, during the worst months of the year, be less than half that of the Navy at large, as figured for the entire year, speaks volumes for the healthfulness of the locality.

The main measures employed looking toward the prevention of disease have been those directed against mosquitoes. This has been done by ridding the post of their breeding places by the usual methods of filling, draining, and cutting away undergrowth, and also by screening against the insects themselves.

Appropriate measures are taken on the appearance of any quarantinable disease.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL AIR STATION, SAN DIEGO, CALIF., FOR THE YEAR 1921.

From a general hygienic standpoint, this station is ideal. As has been previously shown, the illness encountered has been of a mild character. There have been no epidemics nor have there been any drainage problems. The food and water supplies are excellent. The work of the entire personnel is very seldom interfered with as a result of inclement weather.

The progress made during the past year in the construction of new and permanent buildings to replace the old temporary wooden structures has been very encouraging. The cleaning up of the grounds, the planting of more grass and trees, the disposal of old scrap lumber, iron, etc., has made a wonderful change in the appearance of this station.

The cooperation given the sanitary officer and this department by the commanding officer of the station and other heads of departments has been unusual, and with the continuance of the same cooperation there will be as great a change, no doubt, during the coming year as there was in the past.

In this connection it might also be stated that very good work has been done by this department in cooperation with the Interdepartmental Social

Hygiene Board in San Diego. As a result of this work during the year 1920, a favorable report for this station was made by the Surgeon General of the United States Navy in his annual report to the Secretary of the Navy for the fiscal year 1921. The field agent of the Interdepartmental Social Hygiene Board, on the 29th of December, 1921, sent the following letter to the senior medical officer of this station:

"The field agent of the Interdepartmental Social Hygiene Board wishes to express to you her appreciation for the warm cooperation received from you during the past year.

"Infection questionnaires received throughout the year and prophylaxis questionnaires have been valuable sources of information on vice conditions in the city.

"It is recognized that the sailor is frequently reluctant to give definite data, and that the matter contained in questionnaires is sometimes so vague as to be useless, also that the sailor occasionally misstates the facts; nevertheless, the amount of authentic information secured makes the questionnaires most valuable.

"Out of 15 hotels mentioned in naval air questionnaires, 11 were already known to the interdepartmental office as places catering to prostitution. The questionnaire furnished information additional to that already on hand on which to base reports to law-enforcing officials. Action looking toward abatement has been taken by the district attorney on 4 hotels, and like action is being asked by the interdepartmental agent in the case of 6 others."

The fact that the efforts of this department have not been in vain in lowering the venereal disease rates, and that the information given to the agents of the interdepartmental board has been of some value, is encouraging as well as an incentive for still greater efforts.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL STATION (MARINE BARRACKS), ST. THOMAS, VIRGIN ISLANDS, FOR THE YEAR 1921.

During the past year there was an epidemic of dengue among the service personnel, which was present from August to November, inclusive. The peak of the epidemic was reached in August when there were 50 admissions. No cases appeared after November. Dengue was not confined to the enlisted personnel, practically all the natives also being attacked. All cases appearing among marines were transferred immediately to hospital, because of lack of space to care for them. The antimosquito campaign was pushed vigorously during this time until mosquitoes were reduced to a minimum, but without noticeable effect on the epidemic, which was probably due to the fact that the disease was prevalent in town and to the fact that men were exposed to mosquitoes while on liberty.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL TRAINING STATION, SAN FRANCISCO, CALIF., FOR THE YEAR 1921.

To indicate the wide difference in personnel obtained during painstaking methodical recruiting during the fall of 1921 as compared with intensive recruiting during the fall of 1920 and the spring of

1921, the following data submitted by the station psychiatrist are most convincing and instructive:

	Intensive.	Painstaking.
Mentally the grades scored:	*Per cent.*	*Per cent.*
No. 4	19.10	20.67
No. 3	15.83	23.28
No. 2	16.89	16.33
No. 1	48.18	38.71
Educationally the grades scored:		
No. 4	2.64	7.50
No. 3	28.81	35.55
No. 2	15.85	16.44
No. 1	52.70	38.84
Industrially the grades scored:		
No. 4	.62	.00
No. 3	5.91	8.56
No. 2	90.00	90.44
No. 1	3.47	.98
Of recruits found deficient by Stern's test and reexamined by Goddard's short test the percentage showing mental age of 13 years or over was	11.6	30.20

This certainly indicates that there has been recently greater appreciation of what morons really are and that they can be eliminated.

The States uniformly furnishing poor recruit material have been Arkansas, Texas, Iowa (which has undoubtedly been the fault of recruiting medical officers), Colorado, and Louisiana.

The above findings have been quite fully borne out by most records and efficiency reports kept by company officers.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL TRAINING STATION, GREAT LAKES, ILL., FOR THE YEAR 1921.

The drop in infectious diseases during the second half of the year is due to the fact that recruit training stopped August 1 and represents the influence of the shift from immune to nonimmune personnel.

The variations in venereal rates are too changeable to warrant conclusions. Time will doubtless demonstrate that prostitution and venereal disease are in inverse proportion to the marriage rate. Matrimony is the only factor which influences for any considerable time the venereal rate. As matrimony is largely a financial problem, conditions which improve finances and encourage matrimony decreases venereal diseases. When one man has sufficient income and assumes the financial responsibility for one woman we have matrimony. When two or more men must combine their incomes to assume the financial burden the result is prostitution. The low venereal rate during the war was the result of the high marriage rate among the personnel, and as the marriage rate gradually decreases the venereal rate will again reach the figures prevailing previous to the war.

There was no extensive epidemic of any of the contagious diseases during the year.

Smallpox occurred on the station in January and seven cases developed. The first was due to contact in Nashville, Tenn., prior to enlistment. Five

other cases were contracted primarily and secondarily from a woman in Lima, Ohio. The seventh was due to contact in Chicago, Ill. Immediately upon the appearance of smallpox all men were carefully inspected for recent vaccination scars and those not presenting satisfactory scars were vaccinated and revaccinated until a positive or an immunity reaction was observed. In spite of most careful inspections and vaccinations six more cases developed, three, however, being due to cross infections, two through possible contact while on furlough, and one whose source of infection was not obtained.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL AIR STATION, PENSACOLA, FLA., FOR THE YEAR 1921.

The general sanitary condition of this station for the year 1921 has been excellent. The naval reservation covers an area of about 1,500 acres, of which the air station occupies but a small portion. The land is low, sandy, and covered by timber and underbrush. There are numerous small ponds and marshes which are inlets from Pensacola Bay. Much progress has been made in clearing this land and draining the marshes near the reservation villages of Warrington and Woolsey. Approximately 10 miles of drainage ditches have been dug and oil drips of 5 gallons' capacity each placed in the marshes. A sanitary squad of five enlisted men, under the guidance of a medical officer, clears the adjacent land of undergrowth and keeps the ditches clear, clean, and well oiled. As a result of these measures breeding places for Anopheles mosquitoes have been almost eradicated. There have been only two cases of malaria during the year that may be traceable to infection at this station.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, PACIFIC COAST TORPEDO STATION, KEYPORT, WASH., FOR THE YEAR 1921.

Gonorrhea has caused the largest number of admissions for the communicable diseases. Practically all of the cases were admitted during the first half of the year. During the latter part of the summer there was established in the Grand Trunk Pacific Dock in Seattle a Navy venereal prophylactic station. Since that time there has been a marked decrease in venereal disease at this station. Up to the time of the establishment of the venereal prophylactic station in Seattle usually 6 to 12 hours intervened between time of exposure and the time that prophylaxis was taken. This delay was a result of the boat schedule between this station and Seattle.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, POST DISPENSARY, MARINE BARRACKS, CHRISTIANSTED, ST. CROIX, VIRGIN ISLANDS, FOR THE YEAR 1921.

The prevailing diseases in the Virgin Islands are: Elephantiasis, enteritis, tonsilitis, trachoma, and the venereal diseases. The new municipal laws making it mandatory for all those affected with venereal disease to take treatment under penalty of jail sentence is acting very favorably on the number of cases. Lectures have been given to the men at various times when the dangers of venereal disease were thoroughly explained to them. The prophylaxis room is open at all times and a complete record kept of all treatments. Eighteen men have received prophylactic treatment during the year. The men who are exposed and fail to take prophylactic treatment are severely dealt with.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL HOSPITAL, ST. THOMAS, VIRGIN ISLANDS, FOR THE YEAR 1921.

The Navy and Marine Corps activities at this station are located in the heart of the town, and necessarily the enlisted personnel comes in frequent close contact on streets and in shops with the native population, a large proportion of which is colored. It is of particular interest to note that during the year two highly contagious diseases occurred, in epidemic form, among the natives, without spreading to the service personnel. From February to June 451 cases of mumps were reported among the natives, but not a single case occurred among the enlisted personnel. From October to December measles spread over the entire town. Eight hundred and sixty-five cases were reported, occurring largely among school children. One mess attendant, a native of St. Thomas, and one private marine were the only two cases admitted to the hospital with this disease. Although the infection appeared to be highly contagious among the natives, it ran a comparatively mild course, with few complications and practically no mortality.

In August dengue appeared among the Americans, affecting particularly those who had arrived recently. One hundred and three cases were treated at the hospital. Most of the natives of the island, and especially the colored population, escaped having this disease, possibly because of the immunity acquired previously, as dengue has not been unknown to these islands.

In spite of continuous efforts on the part of the municipal sanitary service, mosquitoes are still plentiful throughout the town. The Stegomyia predominates and finds abundant breeding places in numerous old tins in back yards. This condition results from not having a municipal water supply. Everyone is dependent on rain water, which is stored in all kinds of receptacles from well-screened, fish-stocked, mosquito-free cisterns to all kinds of rusted tins swarming with larvæ. Should an unrecognized case of yellow fever be imported, the result might be most disastrous.

The Culex fatigans is common throughout the island, and is probably responsible for the extensive infection with filaria which prevails among the colored natives. In only a few isolated places throughout the country are Anopheles found, and malaria practically does not exist on these islands.

Cases of venereal disease constantly occur, but the number of patients is not excessive when compared with other communities of similar size. The municipal sanitary service is very successful in locating and treating infected prostitutes. Several cases of climatic bubo have been treated in the hospital. The serum test in each case was found negative.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL HOSPITAL, YOKOHAMA, JAPAN, FOR THE YEAR 1921.

Smallpox, cholera, and plague are constantly present in China. As many ships and passengers are constantly coming to Japan from Chinese ports, the danger of introducing these diseases into Japan is ever present. The Japanese quarantine measures have of late years improved to such an extent that very few cases of cholera, plague, or smallpox come to Japan unrecognized.

The Japanese are strong believers in vaccination against smallpox. All school children are now vaccinated, so no smallpox epidemic of any severity can occur.

The Japanese also believe in administering cholera serum to people who may be exposed to cholera.

Plague has been kept out of Japan in the past few years. Occasional cases come to the quarantine stations from China.

INSTRUCTIONS TO MEDICAL OFFICERS.

Bu. M&S. 9 Feb. 1922. 129733(21).

TREASURY DEPARTMENT,
BUREAU OF WAR RISK INSURANCE,
Washington, February 3, 1922.

In reply refer to:
RWB/emp 10
Hospital Section.

The SURGEON GENERAL,
U. S. Navy, Washington, D. C.

SIR: The following letter is this date being sent to all our district managers. It is requested you notify the various hospitals under your control that care for patients of this bureau of its contents.

"The following question has recently been submitted to the central office for decision and ruling:

"It is requested that the central office give us a ruling as to whether or not claimants and beneficiaries of the U. S. Veterans' Bureau, who are hospitalized because of an order from this bureau, who refuse to accept spinal punctures for diagnostic purposes, or obstruct in any other way procedures which are considered necessary by the hospital authorities for the purpose of making diagnosis or rendering treatment, are allowed transportation to their homes or to the point from which they were sent to the hospital under order of the district manager."

"Patients discharged from hospital, if discharged in the regular way for completion of treatment, do not come under General Order #27–A, and are entitled to transportation and necessary expenses as outlined in U. S. V. B. Regulation #16 (January 14, 1922); B. W. R. I. Field Order #20 (July 10, 1921); General Order #26, U. S. V. B. (September 6, 1921).

"Under General Order #27–A, patients discharged against medical advice receive transportation expenses as outlined above for their first discharge. On any subsequent discharge against medical advice they are not entitled to transportation or other expenses as outlined above. This same statement applies to patients discharged for disciplinary reasons. Unless a patient is discharged for the second time against medical advice, or for the second time for disciplinary reasons, he is entitled to transportation and other expenses to his home or to the point from which hospitalized, as outlined above.

"However, patients who refuse to accept spinal puncture for diagnostic purpose or obstruct in any other way the procedures which are considered necessary by the hospital authorities for the purpose of making diagnosis or rendering treatment should be examined by a board of medical officers at the hospital, and the recommendations of the board, if approved by the medical officer in charge of the hospital, should be forwarded to the central office for final action.

"This board of medical officers should be cognizant of and consult section 303 of the war risk insurance act. A patient so obstructing or refusing treatment distinctly comes under section 303 of the war risk insurance act, and the penalty for such obstruction is clearly outlined in this section.

"For your information there is inclosed a copy of hospital division similar letter #154, dated January 14, 1922, issued by the U. S. Public Health Service."

Yours, very truly,

C. R. FORBES,
Director U. S. Veterans' Bureau.

Encl.

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L–795

PROCEDURE PRESCRIBED BY THE U. S. VETERANS' BUREAU FOR PATIENTS REFUSING TREATMENT.

TREASURY DEPARTMENT,
BUREAU OF THE PUBLIC HEALTH SERVICE,
Washington, January 14, 1922.

HOSPITAL DIVISION SIMILAR LETTER No. 154.

To medical officers in charge of U. S. Public Health Service and Marine Hospitals:

For your information and guidance there is quoted below a letter under date of December 8, 1921, from the Director U. S. Veterans' Bureau, which sets forth clearly the procedure recommended in cases where treatment is refused, particularly operations:

"U. S. VETERANS' BUREAU,
"HOSPITAL SECTION,
"*Washington, D. C., December 8, 1921.*

"SURGEON GENERAL,
"*U. S. Public Health Service,*
"*Washington, D. C.*

"DEAR SIR: Your letter dated November 30, 1921, in which you quote the following extract from a letter from the executive officer in charge of one of your hospitals—

"'What shall be our procedure with regard to patients who refuse to accept the treatment recommended by us and who do not request their discharge from the hospital contrary to medical advice?

"'We wish this point to be cleared up, particularly with regard to patients where operation is recommended. We have a class of patients in which it is clear that the only treatment indicated is an operation, which operation the patient refuses to undergo and at the same time desires to continue his stay in the hospital.

"'Are these men to be brought before the disciplinary board and treated as though they had committed a breach of discipline or can they be discharged through a board of survey as not in need of any treatment except operation, which is refused by them?

"'Any light you can give us on these points will be of great assistance to us in disposing of these cases.'

"is answered as follows:

"A patient of this bureau who refuses to accept treatment recommended by the medical officers in charge of his case should be examined by a board of medical officers, and the recommendations of this board, if approved by the medical officer in charge of the hospital, should be forwarded to this bureau for final action.

"This board of medical officers should be cognizant of and consult section 303 of the war risk insurance act. In general, this bureau believes that patients who refuse operation, where it is clear that the only treatment indicated is operation, should be recommended for discharge from the hospital.

"If a patient refuses an advised major operation, and, in spite of the fact that no operation is performed, still needs hospital treatment, he should be retained in the hospital for treatment. A case of this sort particularly comes under the last sentence of section 303 of the act referred to above, which reads:

"'and the consequences of unreasonable refusal to submit to any such treatment shall not be deemed to result from the injury compensated for.'

"Such a patient should be carefully examined by a board of officers and their approved findings forwarded to this office for reference to our compensation section.

"It is desired by this office in all cases of this, or of a similar nature, that the specific case and facts, together with the recommendations of the responsible commanding officer, be forwarded to this bureau for a specific decision.

"Yours, very truly,

"(Sgd.) C. R. FORBES,
"*Director, U. S. Veterans' Bureau.*"

It is directed that medical officers forming the boards indicated acquaint themselves with section 303 of the war risk insurance act as noted above.

Reports submitted pursuant to these instructions, must, of course, be forwarded to the District Manager, U. S. Veterans' Bureau, for transmission to the central office of the U. S. Veterans' Bureau at Washington, D. C.

Respectfully,

H. S. CUMMING, *Surgeon General.*

JRM/eh

Circular letter. WSD/JBC 124942–O
Serial No. 165–1922. 132687–O

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., February 16, 1922.

To: All naval hospitals (Continental United States).
Subject: Urgent repairs to buildings, walks, and roadways.
Reference: (*a*) Paragraph 3, bureau's circular letter, serial No. 94–1921, No. 124942–O(33), April 26, 1921.
(*b*) Dept. #28577–188, SONYD–O–MJC, February 8, 1922, transmitting copy of President's letter of January 26, 1922.

1. Prior to the end of the current fiscal year, the bureau desires that the hospitals shall undertake such minor repairs, including painting, as may be necessary for actual preservation of property and to maintain the buildings in fit condition to receive patients during the fiscal year 1923; urgent work on the grounds and repairs to walks and roadways will also receive attention. The painting should include exterior work required on temporary buildings for purposes of preservation rather than for appearances, and reconditioning of hospital furniture. Iron beds and other metal furniture should be repainted instead of being sent to the yard for lacquering.

2. To accomplish this work, the bureau, upon request of the hospital, will authorize the temporary employment of additional workmen (carpenters, painters, plumbers, etc.) until June 30, 1922; employees, when authorized, to be secured through the labor board.

3. It is directed that an estimate be submitted, by separate items, in order of importance, of the work deemed necessary (limited strictly to minor repairs as stated above) to maintain the hospitals in fair condition for another year, specifying:

(*a*) The nature and scope of the work proposed;

(*b*) The number of workmen in each rating required, with estimate of their total pay for the period they will be employed;

(*c*) The cost of the material which will be required, and whether obtainable from naval stores;

(*d*) The cost of any other incidental items of expenditure.

4. The material referred to in paragraph 3 (*c*) hereof will be a charge against "Naval hospital fund"; the employees will be carried on the hospital pay rolls, and will be a charge against the appropriation "Medical Department, 1922."

5. All work recommended must be of a character that can be completed by June 30, 1922.

6. Please expedite reply.

E. R. Stitt.

Circular letter. WJCA: ESK 129733(21).
Serial No. 166–1922.

Department of the Navy
Bureau of Medicine and Surgery,
Washington, D. C., 16 February, 1922.

To: All naval hospitals.

Subject: Action to be taken with Veterans' Bureau patients who refuse spinal punctures, etc., necessary in diagnosis and treatment.

References: (*a*) Director, U. S. Veterans' Bureau letter to Surgeon General, U. S. Navy, RWB/emp 10 Hospital Section, Feb. 3, 1922.
(*b*) Surgeon General, U. S. Public Health Service circular letter No. 154 of Jan. 14, 1922.

Enclosures: (2).

1. References (*a*) and (*b*), regarding procedure prescribed by the U. S. Veterans' Bureau for patients refusing treatment, are forwarded for your information.

E. R. Stitt.

Circular letter. JTB: ESK 129733(23).
Serial No. 167–1922.

Department of the Navy
Bureau of Medicine and Surgery,
Washington, D. C., 25 February, 1922.

To: All naval hospitals.

Subject: Veterans' Bureau patients for whom domiciliary care is necessary.

References: Letter of Director, U. S. Veterans' Bureau RWB/jat: 10–Hospital Section of February 18, 1922.

1. For your information there is quoted herewith the contents of a letter from the Director of the U. S. Veterans' Bureau under date of February 18, 1922 (RWB/jat: 10).

"It is requested that the medical officers in charge of the hospitals under your jurisdiction be advised that any patient whose physical condition is such as to require relatively little in the nature of medical care and treatment, but for whom domiciliary care is necessary, should be transferred to an appropriate soldiers' home.

"All such patients should, on the initiative of the medical officer in charge, be brought to the attention of the district manager, with a recommendation that such transfer be effected."

E. R. Stitt.

Circular letter. WSD/JBC 124677-O.
Serial No. 168-1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., March 9, 1922.

To: All naval hospitals (continental limits).

Subject: Information for next of kin regarding expenses in connection with the preparation, encasement, and transportation of the remains of the dead.

Enclosure: One pad of N. M. S. Hospital Form No. 61.

1. The enclosed form to be used in informing the next of kin regarding transportation of remains, etc., has been revised to meet the changes in the law governing payment of burial expenses by the U. S. Veterans' Bureau, contained in the act of August 9, 1921, establishing the Veterans' Bureau, as follows:

"SEC. 22. A new section is hereby added to Article III of the war risk insurance act, to be known as section 315, and to read as follows:

"SEC. 315. That no person admitted into the military or naval forces of the United States after six months from the passage of this amendatory act shall be entitled to the compensation or any other benefits or privileges provided under the provisions of Article III of the war risk insurance act, as amended."

2. It is directed that copies of the old form, "Information for next of kin," be destroyed, and that the enclosed form be used hereafter.

3. Additional copies of N. M. S. Hospital Form No. 61 can be obtained from the Naval Medical Supply Depot, Brooklyn, New York.

E. R. STITT.

VITAL STATISTICS.

Annual rates, shown in the succeeding statistical tables, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{365}{28}$ or $\frac{365}{35}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

Where no figures appear in a given column, it may be taken for granted that the disease did not occur or, if in reference to hospitals, that no case was admitted.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service.*

ATLANTIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
Month ended Jan. 31, 1922.	95	16,977	1,518	1,072.98	1,448	1,023.50	70	49.48	224	158.33
Month ended Feb. 28, 1922	120	13,431	912	814.83	825	737.10	87	77.73	150	134.02
Average of the rates.	.....	.....	.....	943.93	.....	880.30	.....	63.60	.....	146.17

Communicable diseases were reported as follows:

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

ATLANTIC FLEET—Continued.

	Malaria.	Measles.	Mumps.	Pneumonia.	Scarlet fever.	Tuberculosis.	Influenza.
Month ended Jan. 31, 1922:							
U. S. S. Delaware			1	1			167
U. S. S. Wyoming				3	1		115
U. S. S. Utah				1	1		
U. S. S. Columbia				1	1		74
U. S. S. Michigan					1		7
U. S. S. North Dakota	1					1	1
U. S. S. Arkansas							2
U. S. S. Hale		1					
U. S. S. Galveston	1						
U. S. S. Preble							1
U. S. S. John D. Ford							1
U. S. S. Sturtevant							2
U. S. S. Reuben James							14
U. S. S. Wadsworth							2
U. S. S. Black Hawk				1			34
U. S. S. Prometheus			2				
U. S. S. McKee							1
U. S. S. Balch							4
U. S. S. Lebanon							1
U. S. S. Wright							17
U. S. S. Quail							3
Month ended Feb. 28, 1922:							
U. S. S. North Dakota							35
U. S. S. Maryland			1	1			
U. S. S. Winslow							3
U. S. S. McDougal							2
U. S. S. Bridgeport				2			13
U. S. S. Wright							7
U. S. S. Quail							6
U. S. S. Downes							1
U. S. S. Wainright							1
U. S. S. Cummings							3
U. S. S. Fred Tallbott							6
U. S. S. Teal							10
U. S. S. Graham							3
U. S. S. Niagara	1			1			3
U. S. S. Bulmer			1				
U. S. S. Tacoma	1						
U. S. S. Dixie							1
U. S. S. St. Louis							5
U. S. S. Procyon							2
U. S. S. Lardner							1
U. S. S. Coghlan							1
U. S. S. Lamson							1
U. S. S. Toucey							5
U. S. S. Black Hawk				1			14
U. S. S. Prometheus			1				7
U. S. S. Barney							2
U. S. S. Converse							8
U. S. S. Isherwood							10
U. S. S. Flusser							1
U. S. S. Sharkey							3
U. S. S. Worden							2
U. S. S. Ellis							6
U. S. S. Biddle							4
U. S. S. Herbert							7
U. S. S. Tillman							2
U. S. S. Cole							8
U. S. S. Columbia							12
U. S. S. Yukon							6
U. S. S. Brazos							4
U. S. S. Harding							1
U. S. S. Hale							5

ABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

PACIFIC FLEET.

	Number of ships reporting.	Average complement.	Total admissions, all causes.	Annual rate per 1,000.	Number of admissions, disease only.	Annual rate per 1,000.	Number of admissions, accidents, and injuries.	Annual rate per 1,000.	Number of admissions, venereal disease.	Annual rate per 1,000.
onth ended Jan. 31, 1922	145	22,461	869	464.27	815	435.42	54	28.85	216	115.40
onth ended Feb. 28, 1922	76	24,330	998	492.23	949	468.06	49	24.17	70	34.53
Average of the rates	.....	.....	.....	478.00	.....	451.74	.....	26.51	.....	74.96

Communicable diseases were reported as follows:

	Influenza.	Pneumonia.	Tuberculosis.	Mumps.	Malaria.
onth ended Jan. 31, 1922:					
U. S. S. Idaho	1	.....	.....	.....	.....
U. S. S. Texas	75	.....	.....	.....	.....
U. S. S. New York	.....	1	1	.....	.....
U. S. S. Camden	.....	.....	.....	1	.....
U. S. S. Frederick	.....	.....	1	.....	.....
U. S. S. Sinclair	1	.....	.....	.....	.....
U. S. S. Glacier	.....	1	.....	.....	.....
U. S. S. Aulick	1	.....	.....	.....	.....
U. S. S. Vestal	1	.....	.....	.....	.....
U. S. S. Mississippi	1	.....	.....	.....	.....
U. S. S. Kennedy	11	.....	.....	.....	.....
U. S. S. California	1	1	.....	.....	.....
onth ended Feb. 28, 1922:					
U. S. S. Melvin	4	.....	.....	1	.....
U. S. S. Renshaw	1	.....	.....	.....	.....
U. S. S. Babbitt	1	.....	.....	.....	.....
U. S. S. Gannet	8	.....	.....	.....	.....
U. S. S. Hamilton	7	.....	.....	.....	.....
U. S. S. Lamb	5	.....	.....	1	.....
U. S. S. Young	6	.....	.....	.....	.....
U. S. S. Nicholas	2	.....	.....	.....	.....
U. S. S. P. Lee	1	.....	.....	.....	.....
U. S. S. Vestal	27	.....	.....	.....	.....
U. S. S. Dent	1	.....	.....	.....	.....
U. S. S. Patoka	4	.....	.....	.....	.....
U. S. S. Kidder	1	.....	.....	.....	.....
U. S. S. Pensacola	2	.....	.....	.....	.....
U. S. S. Camden	31	.....	.....	.....	.....
U. S. S. Arizona	36	1	.....	.....	.....
U. S. S. Kingfisher	3	.....	.....	.....	.....
U. S. S. Oklahoma	136	1	.....	1	1
U. S. S. Ward	8	.....	.....	.....	1
U. S. S. Boggs	4	.....	.....	.....	.....
U. S. S. Stansbury	2	.....	.....	.....	.....
U. S. S. Badger	1	.....	.....	.....	.....
U. S. S. Corry	6	.....	.....	.....	.....
U. S. S. Kennison	15	.....	.....	.....	.....
U. S. S. Jason	20	.....	.....	.....	.....
U. S. S. LaVallette	20	.....	.....	.....	.....
U. S. S. MacKenzie	3	.....	.....	.....	.....
U. S. S. Wood	3	.....	.....	.....	.....
U. S. S. Montgomery	7	.....	.....	.....	.....
U. S. S. Bailey	1	.....	.....	.....	.....
U. S. S. California	88	.....	.....	.....	.....
U. S. S. Thornton	2	.....	.....	.....	.....
U. S. S. Sloat	23	.....	.....	.....	.....
U. S. S. Stoddert	11	.....	.....	.....	.....
U. S. S. McDermut	2	.....	.....	.....	.....
U. S. S. Marcus	4	.....	.....	.....	.....
U. S. S. Neches	1	.....	.....	.....	.....
U. S. S. Brant	4	.....	.....	.....	.....

TABLE No. 1.—*Monthly report of morbidity from various ships and United States marines on foreign shore service*—Continued.

PACIFIC FLEET—Continued.

	Influenza.	Pneumonia.	Tuberculosis.	Mumps.	Malaria.
Month ended Feb. 28, 1922—Continued.					
U. S. S. Texas	43				1
U. S. S. Jacob Jones	2				
U. S. S. Aulick	26				
U. S. S. Morris	1				
U. S. S. Elliot	1				
U. S. S. Thompson	6				
U. S. S. William Jones	1				
U. S. S. Woodbury	3				
U. S. S. Evans	2				
U. S. S. Wickes	2				

MARINES ON FOREIGN SHORE SERVICE.

	Number of reports received.	Complement.	Admissions communicable disease, exclusive of venereal disease.	Annual rate per 1,000.
Month ended Jan. 31, 1922	15	3,148	97	369.76

Communicable diseases were reported as follows:

	Malaria.	Dengue.	Dysentery.	Pneumonia.
Field hospital, Fifteenth Regiment, Second Brigade, United States Marine Corps, San Pedro de Marcoris, Santo Domingo, Dominican Republic	14		1	
All outposts, San Pedro de Marcoris, Santo Domingo, Dominican Republic	13			
Field hospital, Second Brigade, Santo Domingo City, Dominican Republic	18	9		
Fourth Regiment, United States Marine Corps, Santo Domingo City, Dominican Republic	2	1	1	
United States Marine barracks, Azua, Dominican Republic	3	1		1
United States Marine barracks, training center, Santo Domingo City, Dominican Republic	6	15		
United States Marine aviation force, Santo Domingo, Dominican Republic		1		
First Brigade, Eighth Regiment, Port au Prince, Haiti [1]				
Haitian gendarmerie, United States Marine Corps, Port au Prince, Haiti	1			
Marine Barracks, St. Thomas, Virgin Islands				
Marine barracks, Barahoma, Dominican Republic	4	1		
Marine Barracks, St. Croix, Virgin Islands		2		
Marine detachment, Camaguey, Cuba	2			
Marine detachment, Managua, Nicaragua	2			
Marine detachment, Peking, China [1]				
Naval and Marine Corps graves registration service, Paris, France				

[1] Report not received for January.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922.*

ATLANTIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Battleship and cruiser force.				
U. S. S. Arkansas	1,229	12	117.16	45.99
U. S. S. North Dakota	1,120	11	117.85	51.50
U. S. S. Delaware	1,165	17	175.10	59.75
U. S. S. Florida	1,050	7	80.00	60.52
U. S. S. Wyoming	1,364	14	123.16	86.83
U. S. S. New York	1,187	11	111.20	106.19
U. S. S. Texas	1,125	16	170.66	113.84
U. S. S. Galveston	331	0	0	132.78
U. S. S. Sacramento	184	0	0	180.75
U. S. S. Michigan	244	2	98.36	181.55
U. S. S. Cleveland	291	2	82.47	195.62
U. S. S. Denver	330	11	400.00	195.85
U. S. S. Dolphin	(1)	.....	.....	242.42
U. S. S. Tacoma	322	6	223.60	277.14
U. S. S. Niagara	200	3	180.00	284.83
U. S. S. Utah	1,066	31	348.96	362.14
U. S. S. St. Louis	390	0	0	398.90
U. S. S. Asheville	162	0	0	534.28
Destroyer force.				
U. S. S. Belknap	58	0	0	0
U. S. S. Bell	53	0	0	0
U. S. S. Branch	56	0	0	0
U. S. S. Breckinridge	55	0	0	0
U. S. S. Charles Ausburne	56	0	0	0
U. S. S. Nicholson	49	0	0	0
U. S. S. Porter	52	0	0	0
U. S. S. Wainwright	54	0	0	0
U. S. S. Semmes	62	0	0	18.60
U. S. S. Truxton	116	1	103.44	22.18
U. S. S. Hale	76	0	0	26.31
U. S. S. Dale	47	1	255.31	26.66
U. S. S. Herndon	63	1	190.47	27.58
U. S. S. Ellis	56	0	0	28.03
U. S. S. Little	55	0	0	29.70
U. S. S. Manley	48	0	0	30.76
U. S. S. Bancroft	53	1	226.41	31.08
U. S. S. Craven	51	0	0	31.08
U. S. S. Toucey	51	1	235.29	31.16
U. S. S. Osborne	60	0	0	32.17
U. S. S. Lardner	47	1	255.31	32.69
U. S. S. Ericsson	51	0	0	32.87
U. S. S. McKean	47	0	0	32.96
U. S. S. Hulbert	106	0	0	33.33
U. S. S. J. K. Paulding	68	1	176.47	33.61
U. S. S. Downes	50	1	240.00	34.67
U. S. S. Schenck	85	0	0	36.52
U. S. S. Colhoun	53	1	226.41	36.92
U. S. S. Hatfield	57	0	0	40.74
U. S. S. Mason	63	0	0	44.19
U. S. S. Paul Jones	112	0	0	50.95
U. S. S. Kalk	53	0	0	56.60
U. S. S. Leary	60	2	400.00	56.60
U. S. S. Pope	105	0	0	56.60
U. S. S. Putnam	49	1	244.89	56.87
U. S. S. Dupont	59	2	406.77	58.67
U. S. S. Taylor	56	0	0	59.70
U. S. S. Wadsworth	52	0	0	61.69
U. S. S. Bush	53	1	226.41	64.00
U. S. S. McCalla	57	0	0	64.00
U. S. S. O'Brien	56	2	428.57	64.34
U. S. S. Foote	49	0	0	64.51
U. S. S. Graham	86	0	0	65.04
U. S. S. Connor	50	0	0	65.93
U. S. S. McDougal	75	3	480.00	66.05
U. S. S. King	58	1	206.89	67.41
U. S. S. Shaw	48	0	0	69.97
U. S. S. Balch	48	0	0	71.00
U. S. S. McKee	45	0	0	72.72
U. S. S. Lawrence	130	0	0	75.15
U. S. S. Dahlgren	57	1	210.52	76.31
U. S. S. Dickerson	67	0	0	76.67

[1] No report for January.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

ATLANTIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Destroyer force—Continued.				
U. S. S. Goldsborough	59	0	0	78.81
U. S. S. Rochester	495	2	48.48	79.74
U. S. S. Parker	50	0	0	80.26
U. S. S. Stevens	53	2	452.83	81.08
U. S. S. Winslow	53	0	0	87.91
U. S. S. Peary	95	0	0	92.13
U. S. S. Biddle	53	0	0	92.30
U. S. S. A. P. Upshur	66	1	181.81	92.84
U. S. S. Herbert	74	1	162.16	94.30
U. S. S. Dyer	53	0	0	94.73
U. S. S. Satterlee	60	1	200.00	96.46
U. S. S. Breck	39	0	0	97.29
U. S. S. Worden	53	1	226.41	97.82
U. S. S. Meredith	42	1	285.71	98.38
U. S. S. Bridgeport	668	7	125.74	100.00
U. S. S. Haraden	60	0	0	100.84
U. S. S. Allen	74	0	0	103.00
U. S. S. Pillsbury	111	1	108.10	103.00
U. S. S. Stewart	100	0	0	105.72
U. S. S. Davis	49	1	244.89	106.50
U. S. S. Maddox	50	1	240.00	106.50
U. S. S. Black Hawk	380	8	252.63	110.16
U. S. S. Hopewell	56	2	428.57	110.59
U. S. S. Barney	58	1	206.89	112.67
U. S. S. Gridley	50	0	0	112.67
U. S. S. Blakeley	58	0	0	113.92
U. S. S. Osmond Ingram	52	1	230.76	114.28
U. S. S. Sharkey	67	2	358.20	114.83
U. S. S. Barry	100	0	0	117.07
U. S. S. Ringgold	53	1	226.41	117.64
U. S. S. Noa	102	1	117.64	119.40
U. S. S. Dixie	589	13	264.85	121.06
U. S. S. W. B. Preston	103	3	349.51	127.46
U. S. S. Bernadou	51	2	470.58	127.65
U. S. S. Leonidas	(1)	.....	.....	127.70
U. S. S. Cowell	51	0	0	133.70
U. S. S. Case	58	0	0	139.53
U. S. S. Pruitt	115	3	313.04	148.40
U. S. S. Stringham	55	0	0	150.00
U. S. S. Ford	116	5	517.24	152.45
U. S. S. Crowninshield	53	1	226.41	155.08
U. S. S. Cassin	50	1	240.00	162.60
U. S. S. Sicard	98	0	0	163.38
U. S. S. Hlusser	62	1	193.54	165.13
U. S. S. Converse	53	1	226.41	168.67
U. S. S. Denébola	325	7	258.46	169.01
U. S. S. Bainbridge	109	0	0	169.69
U. S. S. Preble	95	2	252.63	171.42
U. S. S. Tillman	57	2	421.05	173.91
U. S. S. Reid	70	1	171.42	175.00
U. S. S. McCook	56	2	428.57	181.81
U. S. S. Kimberly	50	2	480.00	184.61
U. S. S. Abbott	60	2	400.00	187.01
U. S. S. Caldwell	52	0	0	189.97
U. S. S. Rodgers	53	2	452.83	189.97
U. S. S. Cummings	50	0	0	190.47
U. S. S. Brooks	62	0	0	193.20
U. S. S. Benham	70	2	342.85	194.33
U. S. S. Hopkins	100	4	480.00	196.26
U. S. S. Bagley	56	0	0	199.52
U. S. S. Stockton	51	2	470.58	201.11
U. S. S. G. E. Badger	59	2	406.77	211.26
U. S. S. J. F. Talbot	59	1	203.38	212.12
U. S. S. Humphreys	(1)	.....	.....	213.80
U. S. S. Fairfax	55	0	0	214.83
U. S. S. Sigourney	52	1	230.76	216.21
U. S. S. W. C. Wood	55	3	654.54	216.21
U. S. S. Rowan	43	3	837.20	220.18
U. S. S. Gwin	51	0	0	223.40
U. S. S. Gregory	49	1	244.89	225.80
U. S. S. Cole	58	1	206.89	229.11

[1] No report for January.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

ATLANTIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Destroyer force—Continued.				
U. S. S. Robinson	53	1	226.41	233.98
U. S. S. Kane	114	0	0	236.95
U. S. S. Wilkes	49	2	489.79	251.49
U. S. S. Clemson	54	1	222.22	263.15
U. S. S. Williamson	(1)			281.52
U. S. S. Hunt	57	1	210.52	290.32
U. S. S. Isherwood	50	0	0	292.68
U. S. S. Conyngham	50	5	1,200.00	300.00
U. S. S. Billingsley	48	1	250.00	306.90
U. S. S. Thomas	55	8	1,745.45	309.27
U. S. S. Dallas	90	4	533.33	316.43
U. S. S. Overton	(1)			325.64
U. S. S. Goff	106	5	566.03	358.20
U. S. S. Gilmer	64	0	0	461.53
U. S. S. Reuben James	(1)			463.02
U. S. S. Sands	125	2	192.00	490.56
U. S. S. McFarland	117	7	717.94	551.55
U. S. S. Sturtevant	118	9	915.25	632.65
U. S. S. Childs	127	8	755.90	827.58
Miscellaneous.				
U. S. S. Curlew	51	0	0	0
U. S. S. Israel	95	0	0	0
U. S. S. Owl	57	0	0	0
U. S. S. Artic	244	5	245.90	(2)
U. S. S. Tabousac	39	0	0	(2)
U. S. S. Wright	432	4	111.11	(2)
U. S. S. Harding	52	0	0	28.03
U. S. S. Bobolink	44	0	0	35.50
U. S. S. Swan	(1)			43.79
U. S. S. Sandpiper	73	0	0	46.96
U. S. S. Contocook	40	0	0	47.05
U. S. S. Mahan	103	0	0	49.38
U. S. S. Iuka	46	0	0	54.05
U. S. S. Robin	54	1	222.22	55.55
U. S. S. Quail	67	0	0	63.66
U. S. S. Murray	100	1	120.00	65.75
U. S. S. Lansdale	88	0	0	68.44
U. S. S. Maumee	111	0	0	71.68
U. S. S. Carrabassett	48	0	0	76.19
U. S. S. Chewink	51	0	0	76.19
U. S. S. Relief	437	5	137.29	87.46
U. S. S. Bushnell	313	7	268.37	97.42
U. S. S. Bridge	255	3	141.17	111.59
U. S. S. Proteus	(1)			112.02
U. S. S. Brazos	146	1	82.19	117.39
U. S. S. Algorma	39	1	307.69	123.07
U. S. S. Vireo	58	0	0	126.31
U. S. S. Savannah	690	17	295.65	128.55
U. S. S. Lebanon	130	0	0	129.62
U. S. S. Columbia	768	15	234.37	131.92
U. S. S. Prometheus	470	6	153.19	137.45
U. S. S. Potomac	(1)			137.93
U. S. S. Rail	53	1	226.41	139.53
U. S. S. Olympia	488	9	221.31	145.92
U. S. S. Mayflower	191	2	125.65	157.09
U. S. S. Hannibal	178	2	134.83	159.09
U. S. S. Vixen	81	0	0	166.66
U. S. S. Shawmut	325	10	369.23	174.20
U. S. S. Mallard	52	1	230.76	184.61
U. S. S. Eagle No. 31	857	17	238.03	189.26
U. S. S. Maury	96	2	250.00	189.47
U. S. S. Eagle No. 17	564	7	148.93	192.04
U. S. S. Teal	67	1	179.10	193.54
U. S. S. Montcalm	39	0	0	200.00
U. S. S. Scorpion	132	1	90.90	225.94
U. S. S. Redwing	50	2	480.00	228.57
U. S. S. Patapsco	33	0	0	229.88
U. S. S. Fulton	137	7	613.19	309.96
U. S. S. Nereus	174	1	68.96	364.28
U. S. S. Nokomis	(1)			391.69

[1] No report for January.

[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

PACIFIC FLEET.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Battleship and cruiser force.				
U. S. S. Nevada	1,063	3	33.86	73.91
U. S. S. Mississippi	1,102	10	108.39	80.58
U. S. S. Oklahoma	1,011	5	59.34	84.62
U. S. S. New Mexico	1,214	13	128.50	88.19
U. S. S. Arizona	1,137	7	73.87	89.45
U. S. S. California	1,543	10	77.77	108.22
U. S. S. Idaho	1,040	12	138.46	110.99
U. S. S. Pennsylvania	1,150	14	146.08	142.37
U. S. S. Maryland	1,163	22	226.99	142.91
U. S. S. Tennessee	1,094	12	131.62	181.71
Destroyer force.				
U. S. S. Edwards	41	0	0	0
U. S. S. Farenholt	94	0	0	0
U. S. S. Fuller	54	0	0	0
U. S. S. Gillis	102	0	0	0
U. S. S. Thatcher	47	0	0	0
U. S. S. Williams	35	0	0	0
U. S. S. O'Bannon	100	0	0	18.34
U. S. S. Crane	188	0	0	21.01
U. S. S. MacDonough	93	0	0	21.27
U. S. S. Selfridge	98	0	0	21.58
U. S. S. Melvin	97	0	0	23.34
U. S. S. Bulmer	62	0	0	25.26
U. S. S. Melville	398	2	60.30	26.19
U. S. S. Somers	55	1	218.18	29.26
U. S. S. Welles	54	1	222.22	31.25
U. S. S. Babbitt	54	0	0	31.33
U. S. S. Aulick	56	0	0	33.80
U. S. S. S. P. Lee	48	0	0	34.48
U. S. S. Farragut	47	0	0	37.15
U. S. S. Renshaw	106	0	0	37.73
U. S. S. Palmer	43	0	0	37.97
U. S. S. Walker	38	0	0	38.58
U. S. S. Wood	100	0	0	38.77
U. S. S. Howard	102	1	117.64	38.83
U. S. S. Prairie	495	0	0	39.89
U. S. S. Greene	41	0	0	40.26
U. S. S. Chew	37	0	0	41.95
U. S. S. Young	[1]			42.17
U. S. S. McCormick	59	0	0	42.32
U. S. S. Nicholas	44	0	0	44.94
U. S. S. Lamberton	96	1	125.00	45.11
U. S. S. Hull	90	0	0	45.54
U. S. S. Gamble	103	0	0	46.42
U. S. S. Yarborough	97	0	0	49.58
U. S. S. Parrott	60	0	0	51.50
U. S. S. Evans	33	0	0	53.21
U. S. S. Claxton	50	0	0	53.33
U. S. S. Sumner	95	1	126.31	54.66
U. S. S. Bruce	48	1	250.00	56.47
U. S. S. Stansbury	88	0	0	57.78
U. S. S. Hogan	85	0	0	58.91
U. S. S. Woodbury	50	0	0	61.69
U. S. S. Charleston	420	2	57.14	62.95
U. S. S. Kidder	100	2	240.00	63.49
U. S. S. Litchfield	62	0	0	63.82
U. S. S. Swasey	36	0	0	64.17
U. S. S. Turner	46	1	260.86	64.86
U. S. S. Thornton	41	0	0	66.11
U. S. S. Coghlan	59	2	406.77	66.29
U. S. S. Crosby	28	0	0	67.98
U. S. S. Marcus	101	2	237.62	68.05
U. S. S. Breese	97	0	0	69.36
U. S. S. Edsall	[1]			69.56
U. S. S. Sloat	98	1	122.44	71.57
U. S. S. Schley	45	0	0	72.72
U. S. S. Shirk	93	0	0	74.07
U. S. S. Badger	64	0	0	75.47
U. S. S. Thompson	47	0	0	75.94
U. S. S. Percival	46	1	260.86	78.17

[1] No report for January.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

PACIFIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Destroyer force—Continued.				
U. S. S. Kennison	55	0	0	78.77
U. S. S. Preston	50	0	0	81.35
U. S. S. Doyen	62	0	0	82.75
U. S. S. Shubrick	44	1	272.72	83.33
U. S. S. Radford	98	0	0	86.48
U. S. S. J. F. Burns	48	0	0	89.88
U. S. S. Chase	(1)			97.16
U. S. S. Meade	42	0	0	98.63
U. S. S. MacKenzie	96	0	0	105.26
U. S. S. MacLeish	61	2	393.44	106.19
U. S. S. Ramsay	95	1	126.31	109.33
U. S. S. Delphy	73	1	164.38	112.67
U. S. S. McDermut	92	1	130.43	115.38
U. S. S. Mullany	86	1	139.53	117.87
U. S. S. Farquhar	60	2	400.00	118.81
U. S. S. Tingey	42	0	0	120.00
U. S. S. Sinclair	33	0	0	120.30
U. S. S. Ballard	41	0	0	120.40
U. S. S. Birmingham	337	3	106.82	120.80
U. S. S. Reno	60	3	600.00	121.21
U. S. S. Buchanan	36	0	0	128.47
U. S. S. Mervine	98	1	122.44	129.03
U. S. S. Hamilton	63	1	190.47	129.87
U. S. S. Robert Smith	107	0	0	131.14
U. S. S. Tattnall	62	0	0	133.33
U. S. S. Stoddert	74	0	0	139.53
U. S. S. Champlin	37	0	0	147.54
U. S. S. Ward	52	0	0	147.78
U. S. S. Hazelwood	35	0	0	150.47
U. S. S. Zeilen	40	0	0	152.86
U. S. S. Chauncey	56	2	428.57	156.25
U. S. S. Twiggs	58	0	0	156.25
U. S. S. Philip	87	1	137.93	160.00
U. S. S. LaVallette	92	0	0	175.18
U. S. S. Aaron Ward	37	0	0	177.21
U. S. S. Meyer	40	0	0	179.10
U. S. S. Corry	104	2	230.76	179.64
U. S. S. Moody	35	0	0	181.36
U. S. S. Buffalo	(1)			185.77
U. S. S. Kilty	58	5	1,034.48	190.90
U. S. S. Boggs	46	1	260.86	193.10
U. S. S. Lea	36	0	0	194.07
U. S. S. McCawley	40	0	0	197.80
U. S. S. Simpson	53	1	226.41	200.74
U. S. S. Yarnall	32	0	0	211.35
U. S. S. Elliott	32	2	750.00	216.99
U. S. S. Kennedy	89	3	409.49	227.48
U. S. S. Henshaw	36	0	0	228.57
U. S. S. Montgomery	103	0	0	241.93
U. S. S. Jacob Jones	45	2	533.33	250.00
U. S. S. Paul Hamilton	53	3	679.24	265.59
U. S. S. Morris	37	1	324.32	270.42
U. S. S. Bailey	37	1	324.32	272.72
U. S. S. William Jones	50	0	0	286.39
U. S. S. Lamson	53	5	1,132.07	342.85
U. S. S. Greer	37	2	648.64	363.63
U. S. S. Tarbell	36	0	0	408.16
U. S. S. Upshur	35	0	0	436.36
Miscellaneous.				
U. S. S. Partridge	45	0	0	0
U. S. S. Yukon	91	0	0	0
U. S. S. Lapwing	(1)			0
U. S. S. Haneock	130	0	0	23.07
U. S. S. Tern	48	0	0	31.57
U. S. S. Turkey	54	0	0	43.47
U. S. S. Neptune	177	1	67.79	56.87
U. S. S. Sonoma	51	0	0	63.15
U. S. S. Pinola	42	0	000	65.93
U. S. S. Seagull	58	1	206.89	68.57
U. S. S. Vega	103	1	116.50	71.42

[1] No report for January.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

PACIFIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Miscellaneous—Continued.				
U. S. S. Brant	45	0	0	72.72
U. S. S. Penguin	54	0	0	74.30
U. S. S. Baltimore	350	0	0	76.50
U. S. S. Vestal	386	2	62.17	76.66
U. S. S. Merey	279	4	172.04	78.35
U. S. S. Aroostook	700	4	68.57	79.80
U. S. S. Glacier	125	1	96.00	82.70
U. S. S. Eagle No. 11	37	0	0	84.55
U. S. S. Tanager	55	0	0	94.73
U. S. S. Burns	94	1	127.65	97.03
U. S. S. Ludlow	105	0	0	97.29
U. S. S. Ingraham	109	1	110.09	111.25
U. S. S. Kanawha	112	2	214.28	113.87
U. S. S. Sproston	95	2	252.63	120.17
U. S. S. Camden	612	5	98.03	121.61
U. S. S. Gannet	56	0	0	122.44
U. S. S. Frederick	339	2	70.79	124.84
U. S. S. Anthony	98	1	122.44	130.43
U. S. S. Rappahannock	251	3	143.42	134.32
U. S. S. Chicago	969	13	160.99	141.49
U. S. S. Kingfisher	45	0	0	172.91
U. S. S. Cardinal	52	1	230.76	173.41
U. S. S. Connecticut	872	3	41.28	175.25
U. S. S. Jason	167	2	143.71	191.75
U. S. S. Stribling	98	1	122.44	209.39
U. S. S. Cuyama	94	2	255.31	213.99
U. S. S. Pigeon	[1]	.....	.....	250.00
U. S. S. Thrush	48	0	0	265.19
U. S. S. Sanderling	16	0	0	375.00
U. S. S. Swallow	46	3	782.60	664.35

ASIATIC FLEET.

Battleship and Cruiser Force.				
U. S. S. Albany	289	5	207.61	312.00
U. S. S. Huron	[1]	.....	.....	396.09
U. S. S. New Orleans	[1]	.....	.....	505.03
Destroyer Force.				
U. S. S. Dent	94	0	0	[2]
U. S. S. Roper	[1]	.....	.....	164.15
U. S. S. Panther	219	4	219.17	197.71
U. S. S. J. D. Edwards	[1]	.....	.....	219.63
U. S. S. Rathburne	[1]	.....	.....	220.02
U. S. S. Waters	[1]	.....	.....	261.93
U. S. S. Alden	[1]	.....	.....	274.16
U. S. S. Chandler	[1]	.....	.....	279.06
U. S. S. Whipple	[1]	.....	.....	282.82
U. S. S. Dorsey	[1]	.....	.....	292.17
U. S. S. Borie	[1]	.....	.....	307.69
U. S. S. Broome	[1]	.....	.....	327.08
U. S. S. Smith Thompson	[1]	.....	.....	395.38
U. S. S. Southard	[1]	.....	.....	436.36
U. S. S. Tracey	[1]	.....	.....	476.19
U. S. S. Talbot	[1]	.....	.....	494.02
U. S. S. Barker	[1]	.....	.....	498.04
U. S. S. Zane	[1]	.....	.....	521.73
U. S. S. Hovey	[1]	.....	.....	594.59
U. S. S. Long	[1]	.....	.....	683.10
Miscellaneous.				
U. S. S. Ajax	[1]	.....	.....	0
U. S. S. Piscataqua	[1]	.....	.....	0
U. S. S. submarine base, Cavite	[1]	.....	.....	0
U. S. S. Celtic	[1]	.....	.....	14.03
U. S. S. General Alava	[1]	.....	.....	57.41
U. S. S. Wompatuck	[1]	.....	.....	68.57

[1] No report for January.

[2] First report.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922*—Continued.

ASIATIC FLEET—Continued.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Miscellaneous—Continued.				
U. S. S. Ontario	(1)			119.60
U. S. S. Abarenda	(1)			141.17
U. S. S. Sara Thompson	(1)			166.17
U. S. S. R. L. Barnes	(1)			210.06
U. S. S. Avocet	(1)			210.52
U. S. S. Rainbow	(1)			226.88
U. S. S. Pecos	(1)			258.99
U. S. S. Beaver	(1)			259.11
U. S. S. Monocacy	(1)			277.22
U. S. S. Heron	(1)			277.45
U. S. S. Quiros	(1)			291.73
U. S. S. Rizal	(1)			342.85
U. S. S. Genesee	(1)			350.51
U. S. S. Villalobos	(1)			385.91
U. S. S. Bittern	(1)			410.42
U. S. S. Elcano	(1)			528.44
U. S. S. Palos	(1)			543.68
U. S. S. Hart	(1)			566.43
U. S. S. Napa	(1)			571.42
U. S. S. Pampanga	(1)			602.87
U. S. S. Wilmington	(1)			637.46
U. S. S. Isabel	(1)			664.20
U. S. S. Finch	(1)			1,444.44

UNASSIGNED, INCLUDING SHIPS ON SPECIAL DUTY.

Battleship and cruiser force.				
U. S. S. Ohio	369	5	162.60	208.48
Miscellaneous.				
U. S. S. Canopus	61	0	0	(2)
U. S. S. Capella	100	0	0	(2)
U. S. S. Chaumont	(1)			0
U. S. S. Kaweah	84	2	285.71	(2)
U. S. S. Rapidan	100	10	1,200.00	(2)
U. S. S. Quincy	80	0	0	18.92
U. S. S. Falcon	74	0	0	65.45
U. S. S. Patoka	108	2	222.22	79.68
U. S. S. Gulfport	100	0	0	88.49
U. S. S. Argonne	210	3	171.42	100.00
U. S. S. Nitro	235	4	204.25	112.80
U. S. S. Newport News	(1)			116.85
U. S. S. Kittery	122	0	0	117.64
U. S. S. Orion	183	4	262.29	120.94
U. S. S. Grebe	55	2	436.36	127.65
U. S. S. Caesar	117	0	0	128.85
U. S. S. Houston	123	1	97.56	147.81
U. S. S. Bath	(1)			148.72
U. S. S. Pyro	260	3	138.46	152.70
U. S. S. Henderson	395	2	60.75	175.26
U. S. S. Neches	118	5	508.47	187.50
U. S. S. Cormorant	(1)			211.53
U. S. S. Saturn	169	0	0	231.81
U. S. S. Alameda	(1)			242.31
U. S. S. Ramapo	120	2	200.00	249.71
U. S. S. Pensacola	141	4	340.42	265.61
U. S. S. Salinas	104	5	576.92	292.68
U. S. S. Trinity	113	0	0	359.37
U. S. S. Sapelo	(1)			380.66
U. S. S. Mars	(1)			382.16

[1] No report for January. [2] First report.

TABLE No. 2.—*Annual admission rate per 1,000 for venereal diseases reported from various ships and United States marines on foreign shore service, January, 1922.*

U. S. MARINES ON FOREIGN-SHORE SERVICE.

	Average complement.	Number of cases.	Annual rate per 1,000.	Average rate since July 1, 1921.
Second Regiment, First Brigade, Cape Haitien, Haiti	722	12	199.44	280.18
First Provisional Brigade, Port au Prince, Haiti	[1]	.....	.....	431.81
U. S. Marine Barracks, Barahona, Dominican Republic	55	0	0	0
Fifteenth Regiment, Second Brigade, San Pedro de Macoris, Dominican Republic	[1]	.....	.....	164.74
First Air Squadron, Santo Domingo, Dominican Republic	176	8	545.45	260.73
U. S. Marine Barracks, training center, Santo Domingo, Dominican Republic	170	8	564.70	263.49
Fourth Regiment, Santo Domingo, Dominican Republic	[1]	.....	.....	273.93
U. S. Marine Barracks, Azua, Dominican Republic	62	2	387.09	396.69
Third Regiment, Santo Domingo, Dominican Republic	485	28	692.78	519.73
Post Dispensary, Marine Barracks, St. Thomas, Virgin Islands	187	4	256.68	125.17
U. S. Marine detachment, Camaguey, Cuba	296	5	202.70	117.75
U. S. Marine detachment, American Legation, Managua, Nicaragua	143	1	83.91	182.24
U. S. Marine detachment, American Legation, Peking, China	[1]	.....	.....	404.42

SUMMARY.

	Annual rate per 1,000, January.			Average rate since July 1, 1921.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	0	142.75	1,745.45	0	149.47	1,444.44
Battleship and cruiser force:						
Atlantic Fleet	0	145.91	400.00	45.99	153.38	534.28
Pacific Fleet	33.86	112.52	226.99	73.91	110.64	181.71
Asiatic Fleet	207.61	207.61	207.61	312.00	349.81	505.03
Unassigned, including ships on special duty	162.60	162.60	162.60	208.48	208.48	208.48
Destroyer force:						
Atlantic Fleet	0	195.95	1,745.45	0	139.98	827.58
Pacific Fleet	0	93.90	1,132.07	0	101.52	436.36
Asiatic Fleet	219.17	153.35	219.17	164.15	371.40	683.10
Miscellaneous:						
Atlantic Fleet	0	179.62	613.19	0	131.84	391.69
Pacific Fleet	0	94.54	782.60	0	115.59	664.35
Asiatic Fleet	0	0	0	0	431.94	1,444.44
Unassigned, including ships on special duty	0	185.37	1,200.00	0	179.97	382.16

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, January.		Per cent since July 1, 1921.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	72.42	9.10	68.27	8.64
Battleship and cruiser force:				
Atlantic Fleet	76.22	4.90	63.29	6.92
Pacific Fleet	78.70	9.26	81.83	7.29
Asiatic Fleet	80.00	20.00	43.85	18.46
Unassigned, including ships on special duty	100.00	0	58.56	14.41
Destroyer force:				
Atlantic Fleet	62.43	9.39	71.78	7.50
Pacific Fleet	79.10	8.96	81.62	7.39
Asiatic Fleet	0	50.00	48.18	9.93
Miscellaneous:				
Atlantic Fleet	73.64	6.20	73.34	8.43
Pacific Fleet	83.93	12.50	77.68	7.59
Asiatic Fleet	0	0	53.28	11.92
Unassigned, including ships on special duty	61.22	20.41	67.32	9.86

[1] No report for January.

ABLE No. 3.—*Annual admission rates per 1,000 for venereal diseases reported from various shore stations for the five-week period Jan. 29 to Mar. 4, 1922, inclusive.*

VENEREAL DISEASES.

	Total admissions.	Annual rate per 1,000	Average rate since Jan. 1.	Chancroid.	Annual rate per 1,000.	Gonococcus infection.	Annual rate per 1,000.	Syphilis.	Annual rate per 1,000.
FIRST NAVAL DISTRICT.									
oston, Mass., navy yard	4	74.28	64.63	0	.....	4	74.28	0	.....
ingham, Mass., receiving ship and ammunition depot	7	213.48	160.00	2	60.99	5	152.49	0	.....
ewport, R. I., naval torpedo station	0	.....	8.11	.....	.....	.....	.....	.....	.....
ortsmouth, N. H., navy yard, including naval prison	1	6.62	15.00	0	.....	1	6.62	0	.....
THIRD NAVAL DISTRICT.									
rooklyn, N. Y.:									
Headquarters, naval district	1	17.93	10.50	0	.....	1	17.93	0	.....
Navy yard, including marine barracks	4	87.39	78.60	0	.....	4	87.39	0	.....
Receiving ship (Bay Ridge)	5	43.58	130.32	0	.....	3	26.15	2	17.43
ew London, Conn., naval submarine base	2	16.37	29.75	0	.....	2	16.37	0	.....
FOURTH NAVAL DISTRICT.									
hiladelphia, Pa.:									
Navy yard	0	.....	0	.....	.....	.....	.....	.....	.....
Receiving station	36	297.84	282.00	7	57.91	26	215.11	3	24.82
FIFTH NAVAL DISTRICT.									
nacostia, D. C.[1]	0	.....	67.38	.....	.....	.....	.....	.....	.....
ashington, D. C., marine barracks	2	58.10	33.51	0	.....	1	29.05	1	29.05
ampton Roads, Va.:									
Naval air station	11	157.79	130.96	3	43.03	5	71.72	3	43.03
Naval training station	18	61.59	97.07	7	23.95	8	27.37	3	10.26
Receiving ship at naval base	6	119.76	184.97	0	.....	5	99.80	1	19.96
orfolk, Va., navy yard, including marine barracks	8	126.82	187.76	0	.....	5	79.26	3	47.56
uantico, Va., marine barracks	27	85.14	139.58	3	9.46	21	66.22	3	9.46
SIXTH NAVAL DISTRICT.									
harleston, S. C., receiving ship	0	.....	134.32	0	.....	0	.....	0	.....
arris Island, S. C., marine barracks	4	24.47	32.10	0	.....	3	18.35	1	6.11
SEVENTH NAVAL DISTRICT.									
ey West, Fla., naval station [1]	1	78.78	38.46	0	.....	1	78.78	0	.....
EIGHTH NAVAL DISTRICT.									
ew Orleans, La., naval station	4	277.33	480.00	1	69.33	3	207.99	0	.....
ensacola, Fla., naval air station	10	131.31	136.01	0	.....	5	65.65	5	65.65
NINTH NAVAL DISTRICT.									
reat Lakes, Ill., naval training station	6	50.48	58.69	1	8.41	4	33.65	1	8.41
ELEVENTH NAVAL DISTRICT.									
an Diego, Calif., naval air station [1]	1	11.55	10.49	0	.....	1	11.55	0	.....
an Pedro, Calif., naval submarine base	8	84.63	47.66	1	10.57	5	52.89	2	21.15
TWELFTH NAVAL DISTRICT.									
are Island, Calif., naval station	10	65.16	78.47	1	6.51		45.61	2	13.03
an Francisco, Calif., naval training station	16	114.67	123.71	3	21.50	8	57.33	5	35.83
THIRTEENTH NAVAL DISTRICT.									
eyport, Wash., naval torpedo station	1	72.72	40.00	0	.....	1	72.72	0	.....
uget Sound, Bremerton, Wash.:									
Navy yard, including marine barracks	1	21.98	25.15	0	.....	1	21.98	0	.....
Receiving ship	4	226.08	187.50	0	.....	4	226.08	0	.....
Total	198	75.22	96.47	29	11.01	134	50.90	35	13.29

[1] Four reports received.

TABLE No. 4.—*Admissions to sick list and admission rates from various shore stations for the five-week period, Jan. 29 to Mar. 4, 1922, inclusive.*

DISEASES AND INJURIES.

	Complement.	Total admissions all causes.	Annual rate per 1,000.	Average rate since Jan. 1.	Total admissions communicable diseases exclusive of influenza.	Annual rate per 1,000.	Average rate since Jan. 1.
FIRST NAVAL DISTRICT.							
Boston, Mass., navy yard	560	52	965.71	818.67	0	.....	0
Hingham, Mass., receiving ship and ammunition depot	341	25	762.46	704.00	0	.....	0
Newport, R. I., naval torpedo station	794	99	1,296.72	1,103.62	0	.....	8.11
Portsmouth, N. H., navy yard, including naval prison	1,570	296	1,960.76	1,275.78	2	13.24	7.50
THIRD NAVAL DISTRICT.							
Brooklyn, N. Y.:							
Headquarters, naval district	580	16	286.89	231.17	0	.....	0
Navy yard, including marine barracks	476	43	939.49	1,100.43	0	.....	0
Receiving ship (Bay Ridge)	1,193	174	1,516.86	2,065.15	2	17.43	10.02
New London, Conn., naval submarine base	1,270	115	941.72	803.30	0	.....	0
FOURTH NAVAL DISTRICT.							
Philadelphia, Pa.:							
Navy yard	305	33	1,125.27	797.20	1	34.09	19.93
Receiving station	1,257	173	1,431.33	1,322.51	0	.....	4.86
FIFTH NAVAL DISTRICT.							
Anacostia, D. C., naval air station [1]	190	31	2,121.05	1,119.71	0	.....	0
Washington, D. C., marine barracks	358	71	2,062.56	1,541.89	0	.....	0
Hampton Roads, Va.:							
Naval air station	725	70	1,004.13	916.77	0	.....	0
Naval training station	3,039	586	2,005.35	1,545.66	11	37.64	26.13
Receiving ship at naval base	521	62	1,237.61	1,225.42	0	.....	11.56
Norfolk, Va., navy yard	656	36	570.72	546.23	0	.....	0
Quantico, Va., marine barracks	3,298	498	1,570.39	1,377.96	6	18.92	16.29
SIXTH NAVAL DISTRICT.							
Charleston, S. C., receiving ship	242	13	558.67	850.74	.....	.....	.....
Parris Island, S. C.	1,700	49	299.76	269.64	1	6.11	6.42
SEVENTH NAVAL DISTRICT.							
Key West, Fla., naval station [1]	165	2	157.57	153.84	0	.....	0
EIGHTH NAVAL DISTRICT.							
New Orleans, La., naval station	150	17	1,178.66	1,360.00	0	.....	0
Pensacola, Fla., naval station	792	54	709.09	680.09	0	.....	7.55
NINTH NAVAL DISTRICT.							
Great Lakes, Ill., naval training station	1,236	119	1,001.28	763.09	0	.....	4.19
ELEVENTH NAVAL DISTRICT.							
San Diego, Calif., naval air station [1]	1,125	34	392.88	314.68	0	.....	0
San Pedro, Calif.	983	88	931.02	667.32	0	.....	5.95
TWELFTH NAVAL DISTRICT.							
Mare Island, Calif., naval station	1,596	97	632.07	620.68	0	.....	0
San Francisco, Calif., naval training station	1,451	264	1,892.19	1,453.59	12	86.00	61.85
THIRTEENTH NAVAL DISTRICT.							
Keyport, Wash., naval station	143	22	1,599.99	960.00	0	.....	0
Puget Sound, Bremerton, Wash.:							
Navy yard, including Marine barracks	473	11	241.86	150.94	0	.....	0
Receiving ship	184	6	339.13	312.50	0	.....	0
Total	27,373	3,156	1,198.96	1,012.11	35	13.29	11.47

[1] Four reports received.

TABLE No. 4 (Contd.)—*Communicable diseases reported from the above-listed stations for the five-week period Jan. 29 to Mar. 4, 1922.*

CEREBROSPINAL FEVER.

Total admissions	2
Annual rate per 1,000	.75
Average rate since Jan. 1	.69
Incidence: Training station, San Francisco, Calif.	2

DIPHTHERIA.

Total admissions	0
Annual rate per 1,000	0
Average rate since Jan. 1	.46

MALARIA.

Total admissions	9
Annual rate per 1,000	3.41
Average rate since Jan. 1	3.22
Incidence:	
Training station, Hampton Roads, Va.	1
Marine barracks, Quantico, Va.	4
Marine barracks, Parris Island, S. C.	1
Trainingstation, San Francisco, Calif.	3

GERMAN MEASLES.

Total admissions	3
Annual rate per 1,000	1.13
Average rate since Jan. 1	.69
Incidence:	
Trainingstation, Hampton Roads, Va.	1
Trainingstation, San Francisco, Calif.	2

MEASLES.

Total admissions	2
Annual rate per 1,000	.75
Average rate since Jan. 1	.46
Incidence:	
Receiving ship, New York	1
Receiving station, Philadelphia, Pa.	1

MUMPS.

Total admissions	3
Annual rate per 1,000	1.13
Average rate since Jan. 1	2.07*
Incidence:	
Receiving ship, New York	1
Trainingstation, Hampton Roads, Va.	2

PNEUMONIA.

Total admissions	12
Annual rate per 1,000	4.55
Average rate since Jan. 1	3.22
Incidence:	
Training station, Hampton Roads, Va.	6
Marine barracks, Quantico, Va.	2
Trainingstation, San Francisco, Calif.	4

SCARLET FEVER.

Total admissions	1
Annual rate per 1,000	.37
Average rate since Jan. 1	.46
Incidence: Training station, Hampton Roads, Va.	1

TUBERCULOSIS.

Total admissions	2
Annual rate per 1,000	.75
Average rate since Jan. 1	.92
Incidence:	
Navy yard, Portsmouth, N. H.	1
Trainingstation, San Francisco, Calif.	1

TYPHOID FEVER.

Total admissions	1
Annual rate per 1,000	.37
Average rate since Jan. 1	.23
Incidence: Navy yard, Portsmouth, N. H.	1

INFLUENZA.

Total admissions	1,319
Annual rate per 1,000	501.08
Average rate since Jan. 1	325.04
Incidence:	
Navy yard, Boston, Mass.	2
Receiving ship, Boston, Mass.	1
Navy yard, Portsmouth, N. H.	232
Headquarters, naval district, N. Y.	4
Navy yard, New York	22
Receiving ship, New York	53
Submarine base, New London, Conn.	54
Navy yard, Philadelphia, Pa.	8
Receiving station, Philadelphia, Pa.	68
Air station, Anacostia, D. C.	26
Marine barracks, Washington, D. C.	18
Air station, Hampton Roads, Va.	29
Trainingstation, Hampton Roads, Va.	268
Receiving ship, naval base, Hampton Roads, Va.	26
Navy yard, Norfolk, Va.	11
Marine barracks, Quantico, Va.	228
Receiving ship, Charleston, S. C.	4
Naval station, New Orleans, La.	5
Submarine base, San Pedro, Calif.	64
Naval station, Mare Island	17
Trainingstation, San Francisco, Calif.	150
Naval torpedo station, Keyport, Wash.	19
Navy yard, Puget Sound, Wash.	10

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the five-week period Jan. 29 to Mar. 4, 1922.*

Hospitals.	Diphtheria.		Malaria.		German measles		Measles.		Mumps.	
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.
napolis										2
arleston				1						1
elsea			1							
eat Lakes	1	1								
y West										
ague Island				2					1	
are Island [1]	1		1							
wport				1					1	
w York			1				2	1	3	1
rfolk			2	3	1				4	4
rris Island										
nsacola										
rtsmouth										
get Sound [1]										1
lantico				5						
n Diego [1]		1							4	4
shington	1			2						1
Total	3	2	5	14	1	0	2	1	13	14

TABLE No. 5.—*Summary of reports from naval hospitals and sick quarters for the five-week period Jan. 29 to Mar. 4, 1922.*

Hospitals.	Pneumonia.		Scarlet fever.		Influenza.		Tuberculosis.		All causes.		
	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Under treatment.	Admitted.	Discharged.
Annapolis	7	11	3	3	7	80	.....	.....	85	227	233
Charleston	.....	3	.....	1	.....	37	.....	2	350	289	302
Chelsea	.....	.....	1	1	7	8	.....	.....	363	266	408
Great Lakes	3	1	1	1	1	1	14	5	670	370	329
Key West	.....	.....	.....	.....	.....	.....	.....	.....	4	6	11
League Island	3	4	2	2	7	78	3	1	250	375	402
Mare Island [1]	1	1	.....	.....	43	65	16	8	446	330	238
Newport	4	.....	.....	.....	5	52	.....	.....	66	92	90
New York	3	6	1	.....	20	57	11	9	531	507	615
Norfolk	15	20	2	3	9	160	4	.....	310	396	444
Parris Island	.....	.....	.....	.....	.....	.....	.....	.....	31	41	48
Pensacola	.....	.....	.....	.....	2	2	1	1	33	42	36
Portsmouth	.....	1	.....	.....	21	86	4	2	54	129	111
Puget Sound [1]	.....	3	.....	.....	30	110	.....	6	109	215	205
Quantico	4	7	.....	.....	39	132	.....	.....	134	306	283
San Diego [1]	2	2	.....	.....	65	192	7	8	355	601	316
Washington	2	1	.....	.....	4	23	.....	.....	269	249	261
Total	44	60	10	11	260	1,090	60	42	4,060	4,441	4,331

[1] Reports for the week ending Mar. 4, 1922, not received.

TABLE No. 6.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the five-week period Jan. 29 to Mar. 4, 1922, inclusive.*

	Navy (complement 106,488).		Marine Corps (complement 21,958)		Total (complement 128,446).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood	1	1.00	0	0	1	0.08
Diseases of circulatory system	41	4.00	4	1.89	45	3.64
Diseases of digestive system	578	56.45	161	76.25	739	59.83
Diseases of ductless glands and spleen	8	.78	2	.95	10	.81
Diseases of ear	95	9.28	26	12.31	121	9.80
Diseases of eye and adnexa	72	7.03	19	9.00	91	7.37
Diseases of genito-urinary system (non-venereal)	153	14.94	37	17.52	190	15.38
Communicable diseases transmissible by oral and nasal discharges	3,131	305.77	411	194.66	3,542	286.76
Communicable diseases transmissible by intestinal discharges	4	.39	2	.95	6	.49
Communicable diseases transmissible by insects and other arthropods	53	5.18	264	125.04	317	25.66
Tuberculosis (all forms)	30	2.93	2	.95	32	2.59
Venereal diseases	1,178	115.04	282	133.56	1,460	118.20
Other diseases of infective type	289	28.22	76	36.00	365	29.55
Diseases of lymphatic system	51	4.98	25	11.84	76	6.15
Diseases of mind	21	2.05	11	5.21	32	2.59
Diseases of motor system	77	7.52	30	14.21	107	8.66
Diseases of nervous system	37	3.61	18	8.53	55	4.45
Diseases of respiratory system	1,934	188.87	469	222.13	2,403	194.55
Diseases of skin, hair, and nails	75	7.32	30	14.21	105	8.50
Hernia	51	4.98	8	3.79	59	4.78
Miscellaneous diseases and conditions	103	10.06	23	10.89	126	10.20
Parasites (fungi and certain animal parasites)	77	7.52	29	13.74	106	8.58
Tumors	15	1.46	4	1.89	19	1.54
Injuries	518	50.59	138	65.36	656	53.11
Poisons	34	3.32	5	2.37	39	3.16
Total	8,626	842.42	2,076	983.26	10,702	866.43

TABLE No. 7.—*Total admissions reported by Form F cards for certain communicable diseases and annual rates per 1,000 for the five-week period Jan. 29 to Mar. 4, 1922.*

Diseases.	Navy (complement 106,488).		Marine Corps (complement 21,958).		Total (complement 128,446).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 8:						
Cerebrospinal fever	1	0.10	0	0	1	0.08
Chicken pox	7	.68	6	2.84	13	1.05
Diphtheria	4	.39	2	.95	6	.49
German measles	8	.78	0	0	8	.65
Influenza	3,038	296.69	396	187.56	3,434	278.02
Measles	4	.39	1	.47	5	.40
Mumps	18	1.76	2	.95	20	1.62
Pneumonia, broncho	18	1.76	2	.95	20	1.62
Pneumonia, lobar	25	2.44	2	.95	27	2.19
Scarlet fever	8	.78	0	0	8	.65
Class 9:						
Typhoid fever	1	.10	0	0	1	.08
Dysentery bacillary	0	0	1	.47	1	.08
Dysentery entamebic	3	.29	1	.47	4	.32
Class 10:						
Dengue	11	1.07	78	36.94	89	7.21
Malaria	39	3.81	186	88.10	225	18.22
Filariasis	3	.29	0	0	3	.24
Class 11: Tuberculosis (all forms)	30	2.93	2	.95	32	2.59
Class 12:						
Chancroid infections	264	25.78	95	44.99	359	29.06
Gonococcus infection	770	75.20	147	69.62	917	74.24
Syphilis	144	14.06	40	18.95	184	14.90
Total	4,396	429.31	961	455.16	5,357	433.70

TABLE No. 8.—*Deaths reported, entire Navy, for the five-week period Jan. 29 to Mar. 4, 1922, inclusive.*

	Navy (complement 106,488).	Marine Corps (complement 21,958).	Total (complement 128,446).
Influenza-pneumonia	4	0	4
Pneumonia, broncho	3	0	3
Pneumonia, lobar	4	1	5
Tuberculosis, chronic pulmonary	2	0	2
Scarlet fever	1	1	2
Diphtheria	1	0	1
Malignant growths	2	0	2
Other diseases	9	2	11
Drowning	5	0	5
Other accidents and injuries	5	3	8
Poisons	1	0	1
Total	37	7	44
Annual death rate per 1,000, all causes	3.61	3.32	3.56
Annual death rate per 1,000, disease only	2.54	1.89	2.43

ORDERS ISSUED TO MEDICAL AND DENTAL OFFICERS AND NURSES.

FEBRUARY 11, 1922:

Lieutenant E. A. Hyland, Dental Corps, U. S. Navy. Detached Separate Battalion of Marines, Camaguey, Cuba, to U. S. S. *Relief*.

FEBRUARY 13, 1922:

Lieutenant Carl A. Broaddus, Medical Corps, U. S. Navy. Detached naval hospital, Washington, D. C., to duty naval training station, Hampton Roads, Va.

Lieutenant H. L. Shinn, Medical Corps, U. S. Navy. Detached receiving ship San Francisco, Calif., to U. S. S. *Jason*.

FEBRUARY 16, 1922:

Lieutenant Commander R. I. Longabaugh, Medical Corps, U. S. Navy. Detached U. S. Public Health Service hospital, Fort Lyon, Colo., to duty naval hospital, Great Lakes, Ill.

FEBRUARY 17, 1922:

Lieutenant W. E. Findeisen, Medical Corps, U. S. Navy. Detached U. S. Public Health Service hospital, Fort Lyon, Colo., to duty, Navy recruiting station, St. Louis, Mo.

Lieutenant Commander G. S. Hathaway, Medical Corps, U. S. Navy. Detached receiving ship, Boston, Mass., to naval torpedo station, Newport, R. I.

Lieutenant Commander G. A. Riker, Medical Corps, U. S. Navy. To duty Navy recruiting station, Washington, D. C.

Lieutenant R. K. Joslin, Medical Corps, U. S. Navy. Detached naval hospital, League Island, Pa., to duty naval station, Guantanamo Bay, Cuba

Lieutenant F. W. Ryan, Medical Corps, U. S. Navy. Detached navy yard, Mare Island, Calif., to duty with Fifth Brigade, U. S. Marines, San Diego, Calif.

FEBRUARY 15, 1922:

Lieutenant Commander J. Buckley, Medical Corps, U. S. Navy. Detached receiving ship, San Francisco, Calif., to duty naval hospital, Puget Sound, Calif.

Lieutenant F. R. Bealer, Medical Corps, U. S. Navy. Detached marine recruiting station, Atlanta, Ga., to duty naval hospital, Charleston, S. C.

FEBRUARY 18 1922:

Lieutenant Z. A. Barker, Medical Corps, U. S. Navy. Detached Squadron Ten, Destroyer Squadrons, Pacilc Fleet, granted sick leave of absence.

FEBRUARY 20, 1922:

Lieutenant J. H. Robbins, Medical Corps, U. S. Navy. Detached naval station, Guantanamo Bay, Cuba, to duty receiving barracks, Hampton Road, Va.

Lieutenant F. H. Webster, Medical Corps, U. S. Navy. Detached naval ammunition depot, Hingham, Mass., to duty navy yard, Boston, Mass.

Lieutenant F. A. Batkin, Dental Corps, U. S. Navy. Detached receiving ship, San Francisco, Calif., resignation accepted effective February 28, 1922.

FEBRUARY 21, 1922:

Captain F. W. F. Wieber, Medical Corps, U. S. Navy. Detached command U. S. Public Health Service hospital, Fort Lyon, Colo., to command naval hospital, San Diego, Calif., reporting May 1, 1922.

Commander F. L. Benton, Medical Corps, U. S. Navy. Detached Separate Battalion Marines, Camaguey, Cuba., to duty nearest receiving ship.

Lieutenant W. W. Behlow, Medical Corps, U. S. Navy. Detached Advanced Base Force, U. S. Marines, San Diego, Calif., to duty Bureau of Medicine and Surgery, Navy Department, Washington, D. C.

Lieutenant C. W. Brunson, Medical Corps, U. S. Navy. Detached naval station, Key West, Fla., to U. S. S. *Wright*.

Lieutenant J. W. Davis, Medical Corps, U. S. Navy. Detached Marine Expeditionary Force, Santo Domingo, resignation accepted.

Lieutenant J. R. Marshall, Medical Corps, U. S. Navy. Detached navy yard, Boston, Mass., to U. S. S. *Vega*.

Lieutenant R. U. Whiteside, Medical Corps, U. S. Navy. Detached naval hospital, Key West, Fla., to duty receiving ship, New York, N. Y.

FEBRUARY 23, 1922:

Lieutenant Commander A. E. Peck, Medical Corps, U. S. Navy. Detached naval hospital, Puget Sound, Wash., to U. S. S. *Pennsylvania*.

Lieutenant B. A. H. Winne, Medical Corps, U. S. Navy. Detached naval recruiting station, Philadelphia, Pa., to naval station, Key West, Fla.

FEBRUARY 24, 1922:

Commander J. L. Neilson, Medical Corps, U. S. Navy. Detached aide on staff commander Destroyer Squadrons, Pacific Fleet; to duty with Fifth Brigade, U. S. Marines, San Diego, Calif.

Commander G. L. Wickes, Medical Corps, U. S. Navy. Detached U. S. S. *Pennsylvania* to duty aide on staff commander Destroyer Squadrons, Pacific Fleet.

Lieutenant (junior grade) F. C. Hertzog, Medical Corps, U. S. Navy. Detached sick quarters, Marine Barracks, Quantico, Va., to U. S. S. *Canopus*.

Lieutenant (junior grade) J. H. Howard, Medical Corps, U. S. Navy. To home, relieved all active duty.

Lieutenant (junior grade) W. F. Krone, Medical Corps, U. S. Navy. Detached naval hospital, New York, N. Y., to home, relieved all active duty.

FEBRUARY 25, 1922:

Lieutenant Commander G. C. Rhoades, Medical Corps, U. S. Navy. Detached naval hospital, Norfolk, Va., to U. S. S. *Langley*.

Lieutenant Commander M. A. Stuart, Medical Corps, U. S. Navy. Detached marine barracks, Quantico, Va., to marine recruiting station, Detroit, Mich.

Lieutenant H. B. LaFavre, Medical Corps, U. S. Navy, to duty marine recruiting station, Cleveland, Ohio.

Lieutenant F. W. Ryan, Medical Corps, U. S. Navy. Detached navy yard, Mare Island, Calif., to duty with Fifth Brigade of Marines, San Diego, Calif.

Lieutenant H. L. Shinn, Medical Corps, U. S. Navy. Detached receiving ship, San Francisco, Calif., to duty marine barracks, Quantico, Va.

FEBRUARY 27, 1922:

Lieutenant E. F. McCall, Medical Corps, U. S. Navy. Detached U. S. S. *Canopus* to duty U. S. S. *Rigel*.

FEBRUARY 28, 1922:

Captain M. F. Gates, Medical Corps, U. S. Navy. Detached command naval hospital, Key West, Fla., to wait orders.

Lieutenant Commander G. W. Calver, Medical Corps, U. S. Navy. Detached U. S. S. *Bridgeport* to Pharmacist Mates' School, Norfolk, Va.

Lieutenant Commander G. B. Trible, Medical Corps, U. S. Navy. Resignation accepted, effective March 25, 1922.

Lieutenant W. M. Davies, Medical Corps, U. S. Navy. Detached marine recruiting station, Cleveland, Ohio, to duty naval hospital, Great Lakes, Ill.

Lieutenant H. E. Ragle, Medical Corps, U. S. Navy. Detached U. S. S. *Birmingham* to medical officer, Destroyer Squadron Ten.

Lieutenant C. D. Roop, Medical Corps, U. S. Navy. Detached navy yard, Philadelphia, Pa., to duty naval hospital, New York, N. Y.

Lieutenant E. G. Hoylman, Dental Corps, U. S. Navy. Detached receiving barracks, Hampton Roads, Va., to naval air station, San Diego, Calif.

MARCH 3, 1922:

Lieutenant J. E. Henry, Medical Corps, U. S. Navy. Detached Naval Medical School, Washington, D. C., March 15, 1922, to U. S. S. *Maryland*.

MARCH 4 AND 6, 1922:

Lieutenant commander H. W. B. Turner, Medical Corps, U. S. Navy. Detached U. S. S. *St. Louis* to navy yard, Philadelphia, Pa.

MARCH 7, 1922:

Lieutenant Commander C. B. Camerer, Medical Corps, U. S. Navy. Detached naval hospital, San Diego, Calif., to U. S. S. *Mercy*.

Lieutenant Commander J. D. Bobbitt, Medical Corps, U. S. Navy. Detached Advanced Base Force, San Diego, Calif., to duty Eleventh Naval District.

Lieutenant R. T. McIntire, Medical Corps, U. S. Navy. Detached naval hospital, San Diego, Calif., to naval hospital, Puget Sound, Wash.

Lieutenant W. W. Russell, Medical Corps, U. S. Navy. Detached marine barracks, San Diego, Calif., to duty Eleventh Naval District.

MARCH 9, 1922:

Lieutenant J. A. Topper, Medical Corps, U. S. Navy. Detached U. S. S. *Rochester* to duty naval hospital, Washington, D. C.

Lieutenant A. G. Wenzell, Medical Corps, U. S. Navy. Detached U. S. S. *Mercy*, to duty naval hospital, San Diego, Calif.

Lieutenant W. H. Wynn, Medical Corps, U. S. Navy. Detached U. S. *Columbia* to receiving ship, Philadelphia, Pa.

Lieutenant J. J. Haas, Dental Corps, U. S. Navy. Detached U. S. S. *Columbia* to temporary duty receiving ship, Philadelphia, Pa.

MARCH 10, 1922:

Lieutenant Commander J. P. Haynes, Medical Corps. U. S. Navy, Detached receiving ship, Philadelphia, Pa., to medical aide, American High Commissioner at Haiti, Port au Prince, Haiti.

The following nurses have been appointed and assigned at the naval hospital at the station indicated:

Annapolis, Md.

Carlson, Ida C., from Brooklyn, N. Y.

Charleston, S. C.

O'Connor, Flora M., from Nashville, Tenn.

Chelsea, Mass.

Crawford, Regina A., from West Newton, Mass.

Donovan, Margaret C., from Middleton, Conn.

Fitzpatrick, Anna Grace, from Boston, Mass.

Great Lakes, Ill.

Byrne, Ella R., from Oak Park, Ill.

Doherty, Marie, from Kindred, N. Dak.

Nelson, Edna I., from Stillwater, Minn.

Perrault, Josephine M., from Oak Park, Ill.

Great Lakes, Ill.—Continued.

Preusser, Louise, from Hannibal, Mo.

Rowan, Margaret V., from Great Lakes, Ill.

Mare Island, Calif.

Dillon, Marie J., from San Francisco, Calif.

Pensacola, Fla.

Wilson, Ina Belle, from New Orleans, La.

Portsmouth, Va.

Langford, Lillian M., from Cybur, Miss.

Williamson, Lucy Belle, from Cybur, Miss.

Washington, D. C.

Hennessy, Lydia J., from Washington, D. C.

The following dietitian has been appointed and assigned at the aval hospital at the station indicated:

Newport, R. I.

ucker, Alice S., from Springfield, Mass.

The following nurses have been transferred to—

Chelsea, Mass.

'Connor, Marion Francis, from San Diego, Calif.

Great Lakes, Ill.

isher, Grace A., from special course in nutrition, Battle Creek Sanitarium, Battle Creek, Mich.

New York, N. Y.

larding, Estelle (via U. S. S. *Chaumont*), from Mare Island, Calif.
ligbie, Julia (via U. S. S. *Chaumont*), from Mare Island, Calif.

Quantico, Va.

Partridge, Florence Rowena, from New York, N. Y.

St. Thomas, Virgin Islands.

Jarvis, Elsie Louise (via U. S. S. *Henderson*), from Washington, D. C.
Mechlin, Helen Marguerite (via U. S. S. *Henderson*), from Washington, D. C.
Rein, Helen (via U. S. S. *Henderson*), from Portsmouth, Va.

Honorable discharge.

ushong, Elizabeth D., February 15, 1922, New York, N. Y.

Resignations.

oothby, Nellie O., March 2, 1922, Guam.
loore, Mary Lillian, February 26, 1922, Parris Island, S. C.
Swarr, Mary E., February 9, 1922, San Diego, Calif.
Webber, Addra, March 11, 1922, Charleston, S. C.

The following nurses in inactive status have been honorably discharged from the service:

oster, Isabelle M., August 31, 1921.
ohnson, Nell B., September 30, 1921.
Kessler Alma T., March 7, 1922.

87783—22——13

VOL. XVI NO. 5

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COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR, MEDICAL CORPS, U. S. NAVY

MAY, 1922
(MONTHLY)

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Compiled and published under authority of Naval Appropriation Act for 1922, approved 12 July, 1921

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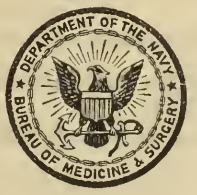

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GOVERNMENT PRINTING OFFICE
1922

NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

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TABLE OF CONTENTS.

Page.

REFACE ---- v

OTICE TO SERVICE CONTRIBUTORS ---- vi

PECIAL ARTICLES:

ON THE ENDOCRINE GLANDS.
By Surgeon Captain Masaharu Kojima, Imperial Japanese Navy ---- 821

AVIATION MEDICINE IN THE UNITED STATES NAVY.
By Lieutenant J. F. Neuberger, Medical Corps, U. S. N ---- 834

PYELONEPHRITIS: A CRITICAL REVIEW OF ONE HUNDRED CASES.
By Lieutenant Commander O. C. Foote, Medical Corps, U. S. N ---- 844

RECURRENT HERNIA.
By Lieutenant Commander Lucius W. Johnson, Medical Corps, U. S. N ---- 849

MENINGOCOCCUS SEPTICEMIA.
By Lieutenant Commander W. A. Bloedorn, Medical Corps, U. S. N ---- 855

ISTORICAL:

PETER ST. MEDARD, SURGEON IN THE NAVY OF THE UNITED STATES.
By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N ---- 867

THE STUDY OF MEDICINE IN STRASBOURG.
By Captain J. S. Taylor, Medical Corps, U. S. N ---- 874

DITORIAL:

ON THE ACQUISITION OF USELESS KNOWLEDGE.—ON THE CONSERVATION OF GAUZE ---- 877

LINICAL NOTES:

REPORT OF A CASE OF SHARK BITE.
By Lieutenant Commander C. R. Baker and Lieutenant C. W. Rose, Medical Corps, U. S. N ---- 881

A PRACTICAL TREATMENT OF ACUTE ULCERATIVE GINGIVITIS.
By Lieutenant C. R. Wells, Dental Corps, U. S. N ---- 883

EPORTS:

A REPORT OF THE INTERNATIONAL STANDARDIZATION OF SERA ---- 885

ROGRESS IN MEDICAL SCIENCES:

GENERAL MEDICINE.—Metabolism in pellagra.—One thousand one hundred goiters in one thousand seven hundred eighty-three persons.—Diphtheria carriers and their treatment with mercurochrome.—Method for determination of death by drowning.—Strain in Spirochetes.—Hereditary blood qualities ---- 889

SURGERY.—Peri-arterial sympathetics.—Factors in bone repair.—Operations on the gall bladder and bile ducts.—Operative procedures for different kinds of goiter.—Varicose ulcers.—Cancer of the tongue ---- 896

TROPICAL MEDICINE.—La maladie des oedemes a Java.—Dysentery.—Dysentery.—Natural immunity of wild rats to plague.—Charcot-Leyden crystals in the stools as an aid to the diagnosis of entamoebic dysentery.—Glycosuria of malarial origin.—Dermatitis venenata produced by an irritant present in stem sap of the mango.—Treatment of trichuriasis with Leche de Higueron.—Malaria in Eastern Cuba.—Dhobie itch produced by inoculating with a culture of *Epidermophyton rubrum*.—Ueber einen Fall von Filaria loa ---- 901

Page

NOTES AND COMMENTS:
The immunization of adults with the diphtheria toxin-antitoxin mixture.—Smallpox in the colony of Bahamas.—Meeting of Royal Society of Tropical Medicine and Hygiene.—Curative effects of chaulmoogra oil derivatives on leprosy.—Virulence of tubercle bacilli under changing environment.—Malaria in Bulgaria.—Methods of drainage.—Use of white lead in paints.—A method of preventive inoculation for smallpox.—Paper on hospital ship ventilation.—Papers by medical officers of the Navy 90
NURSE CORPS 91
DIGEST OF DECISIONS 92
BOOK NOTICES 92
QUERIES 93
PREVENTIVE MEDICINE, STATISTICS, LETTERS, ORDERS, NEW LEGISLATION, MOVEMENTS OF OFFICERS AND NURSES 93

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

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When contributions are typewritten, *double spacing* and wide margins ar desirable. Fasteners which can not be removed without tearing the paper ar an abomination. A large proportion of the articles submitted have an officia form such as letterheads, numbered paragraphs, and needless spacing betwee paragraphs, all of which require correction before going to press. Th BULLETIN endeavors to follow a uniform style in headings and captions, and th editor can be spared much time and trouble and unnecessary errors can b obviated if authors will follow in the above particulars the practice of recen issues. This is not only important in special articles, but still more so i reviews.

The greatest accuracy and fullness should be employed in all citations, as i has sometimes been necessary to decline articles otherwise desirable becaus it was impossible for the editor to understand or verify references, quotations etc. The frequency of gross errors in orthography in many contributions i conclusive evidence that authors often fail to read over their manuscripts afte they have been typewritten.

Contributions must be received two months prior to the date of the issue fo which they are intended.

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The BULLETIN intends to print *only original articles, translations, in whol or in part, reviews, and reports and notices of Government or departmenta activities, official announcements, etc. All original contributions are accepte on the assumption that they have not appeared previously and are not to b reprinted elsewhere without an understanding to that effect.*

U. S. NAVAL MEDICAL BULLETIN

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SPECIAL ARTICLES.

ON THE ENDOCRINE GLANDS.[1]

By MASAHARU KOJIMA, Surgeon Captain, Imperial Japanese Navy.

In recent years much attention has been paid to the question of functional alteration of the endocrine glands, and much progress has been made in this field, particularly from the point of view of clinical medicine. Generally speaking, the whole subject of endocrinology is of very recent origin; it is also very complex. In this lecture I shall therefore endeavor to summarize the most important results of a number of investigations, with some of which I have been closely associated, and to point out, as far as I am able, their significance in helping us to understand the symptoms of disease with which our profession has to deal.

Under the term *endocrine organs or glands* are comprised those organs which elaborate by their cells some specific chemical substance or secretion. This substance is taken up by the blood or by the lymph, though the presence of such substance in the blood or in the lymph can be demonstrated at present only in a few cases. The endocrine glands have no ducts to pour out their secretion, hence the term *internal* is applied to their secretion, and such glands are called "ductless glands"; while those glands, such as the salivary or lacrymal, which deliver their secretions through a duct, have the term *external* applied to their secretions. The term "internal secretion," however, is used in a wide sense to designate all secretory substances which are passed directly into the blood or lymph by the tissues. Claude Bernard was the first who used this term to describe the fact that grape sugar passes into the blood from the cells of the liver; but almost all the tissues have the faculty of producing internal secretion; for instance, the carbon dioxide and other products of metabolism are formed in the tissue and taken up by the blood or lymph. Recently this term has been limited to the secretion of specific organic substances which are produced by certain ductless glands, such as the thyroid, the parathyroid, the suprarenal capsules or adrenals, the pituitary body or hypophysis cerebri, the pineal gland, often spoken of as the epiphysis cerebri or the glandula pinealis, and the thymus. There is evidence that the choroid plexus in the brain may produce some substance which activates the secretion of cerebrospinal fluid.

[1] A lecture delivered at the United States Naval Medical School, Washington, D. C., Dec. 21, 1921.

The spleen is supposed to produce a certain substance which activates the proteolytic ferment of the pancreatic juice. Further investigations will elucidate the function of these organs.

There are some organs which secrete both externally and internally. For instance, the pancreas excretes a most active substance into the intestine for the disgestion of protein and other food elements. On the other hand, it was shown by von Mering and Minkowski in 1889 that the the total extirpation of the pancreas in animals causes glycosuria. It is known that in the pancreas are found two kinds of cells, i. e., the alveolar cells and the cells of Langerhans' islets. And it is a fact that the cells of Langerhans' islets undergo degeneration in some cases of diabetes, while at the same time the alveolar cells of this organ remain intact. The gonads or reproductory glands—ovary and testes—have also the faculty of internal secretion. It is a known fact that the removal of the testes in the young male animals prevents not only the development of the accessory generative organs and of the characteristic features of the male sex, but also the development of secondary characteristics or the manly character. Total removal of the testes in young cocks prevents the growth of the beautiful feathers of the male. This insufficiency of the development of male character and of male features can be controlled to a certain extent by grafting a testicle into those animals. But if an ovary is grafted, instead of a testicle, there appears some difference in the features and in the character, producing a feminized male. The removal of the ovaries in young animals interrupts the development of the female genital organs; and by grafting the ovary in those animals such disturbances can be controlled to some degree. But by grafting the testicle instead of the ovary in this case, there appear masculinized female character and features. It seems, therefore, that the testicle and ovary produce a certain active substance which has close relationship to the development of specific features and secondary characteristics of the sex. Another example of the coincidence of an external and an internal secretory function is the duodenum. It was found by Starling and Bayliss that if an extract of the duodenal epithelium after boiling with dilute hydrochloric acid and neutralization is injected into the artery of the pancreas of an animal, a rapid flow of pancreatic juice is determined. This flow of pancreatic juice is not a nervous reflex, but is the effect of the absorption of a substance in the extract. Therefore, the epithelium of the duodenum produces an internal secretion. The gastric juice flowing into the duodenum cooperates with the duodenal epithelium to elaborate the internal secretion which is taken up by the blood, and which activates the pancreatic secretion. This substance is called *secretine* by Starling and Bayliss.

Some of these substances have an influence upon the growth and utrition of certain organs or on the body as a whole; they are ccordingly termed by Prof. Glay *morphogenetic*. In general, some f the substances, which are produced by the endocrine organs, have n effect upon the tissues immediately, while others exert their inuence more slowly, so that the results of their action may only ecome apparent after a long period of time. The activity of the ubstances produced by endocrine organs are for the most part not estroyed by prolonged boiling. They are dialysable; most of them re not yet isolated. Only one—the active principle of the suprarenals—can be isolated in a crystalline form. This is adrenalin, hich was for the first time freed from impurities by the Japanese hemist Takamine.

To the active substance yielded by the endocrine organs the term *ormone* was applied by Starling. It means "to stir up," and is of reek origin. This term may be adapted to those substances which imulate or excite the cell functions, as in the case of secretine. ccording to Starling, the definition of hormone is to include any ubstance formed in the cells of the body and carried by the blood ream to distant parts, where it operates for the good of the organism. It is probable that certain substances, such as glucose and some norganic salts, which are produced in various parts of the body nd affect distant organs, may come under this definition. But the erm "hormone" is used to denote those substances in the blood hich excite cells of the body to activity. There are, however, active ubstances, which depress or inhibit the cell function; and to desigate those substances the term "hormone" is not suitable. For hese Prof. Sir Edward Schafer, of Edinburgh, proposed the term *halone*, which means "to make slack," from its Greek origin.

These substances, both hormonic and chalonic, are grouped under he term *autacoid substance*, or *autacoid*, by Sir Edward Schafer, as he action of these substances is very like the action of alkaloids. utacoid, another word derived from the Greek, means "a self-medicial agent." Those autacoids which act as excitants are hormones or exitatory autacoids, while the others, which cause inhibition, are chaones, or inhibitory autacoids. Some autacoids, such as adrenalin, seem o produce opposite results in different parts of the body. According o Schafer, adrenalin causes contraction of plain muscle fibers of the lood vessels, and on the contrary it produces inhibition of the plain nuscle fibers of the intestine. The feature of action in both cases is xcitation, because it consists of stimulation of the end filaments of he sympathetic nerves.

There are many reasons to assume that the extracts of certain ductess glands are quite specific. This is not the case with the extracts of ther organs, such as the heart, etc. Though our present knowledge

of biochemistry is not sufficient to show the evidence of the presence of such substances in the blood, yet it may be inferred that there are many diseases caused by the alteration or derangement of the secretions of certain ductless glands.

I will now enumerate those diseases. First, derangement of the thyroid—the effects of surgical removal and of atrophy or degeneration of the thyroid, i. e., hypothyroidism.

Schiff in 1865 performed the operation for the first time on animals, and about 20 years after he performed his first experiment published the description of several symptoms causing death after total thyroidectomy. At that time, however, he did not call attention to the parathyroid. After a series of experiments by various workers it was assumed that thyroidectomy in animals causes thickening and dryness of the skin, loss of hair, etc. Later, there appear adiposity, loss of tone of muscles, anæmia, retardation of tissue regrowth, low temperature of the body, interruption of sexual function, change of metabolism, dullness, and apathy. Some of these symptoms are observed in cases of spontaneous atrophy or degeneration of the gland in children. There is arrest of growth, especially of the skeleton, the cartilage bones remaining incompletely ossified; the development of the gonads is much delayed.

Swelling of integument occurs, while the surface of the skin is dry; the hair becomes thin; the face is pale and puffy; the nose is depressed; the hands and feet are podgy; the fontanelles of the skull remain open; the muscles are limp and weak; deaf-mutism and idocy are common. This syndrome is grouped under the term *cretinism*. Cretinism may be sporadic or endemic. The former is generally associated with absence or early atrophy of the thyroid; the latter with goitrous degeneration. The syndrome already mentioned does not appear until some time after birth. It seems to be controlled, in infancy, by the presence of autacoid (of thyroid) from the mother's thyroid; i. e., before birth through the placenta; after birth through the mother's milk.

If atrophy or degeneration of the thyroid occurs in the adult, then the syndrome known as myxodema develops. Besides the usual symptoms, there appears, in case of myxodema general chromatolysis of nerve cells of a subacute nature, as Sir Frederick Mott has pointed out. Symptoms similar to those of myxodema are produced after thyroidectomy in man; i. e., post operative myxodema or cachexia strumipriva. There is another disease with the syndrome similar to hypothyroidism, but in which there is diffuse hypertrophy of the gland. It is designated as endemic goiter. The symptoms in most cases of endemic goiter may be suggestive of hypothyroidism, but some of them are very likely to resemble those seen in Graves's

disease. It seems that the enlarged thyroid, in case of endemic goiter, produces abundant secretion, but the normal autacoid may be deficient. Hence the enlargement of the gland seems to compensate for such deficiency. All these diseases can be entirely cured, if the patient takes the thyroid in the form of substance or of extract. Patients are normal as long as they take the thyroid by mouth, but the symptoms appear if they discontinue the thyroid intake. It is apparent, therefore, that these diseases are caused by the absence or deficiency of the thyroid autacoids.

There is another disease, known as Graves's or Parry's disease, which in the opinion of many authors is caused by enlargement of the thyroid with exaggerated secretion. This view is based upon two observed facts that certain symptoms similar to those of Graves's disease appear after excessive administration of thyroid, and that most of the symptoms of this disease are unlike those which are caused by atrophy or defect of the thyroid. Hence the term *hyperthyroidism* is employed by most authors to designate Graves's disease. Certain facts suggest that Graves's disease is caused by the excessive and changed secretion, i. e., *dysthyroidism*.

In case of total parathyroidectomy there appear serious symptoms known as *tetany* or *tetania parathyreopriva*. The tetany may not appear under normal conditions in animals with insufficiency of parathyroid or after partial parathyroidectomy, but may appear under certain conditions, such as during pregnancy or lactation. In some cases of tetany, which occur during pregnancy or during the course of infectious diseases, similar symptoms to those of tetania parathyreopriva are observed, and in those cases there was degeneration or hemorrhage into the parathyroid. Similar changes have, however, been found post mortem in the parathyroids without tetany symptoms during life. The diminution of the function of parathyroid seems to be associated with certain diseases such as *Thomsen's disease*, *paralysis agitans*, *chorea*, *epilepsy*, and *eclampsia*. It has been shown that some cases of paralysis agitans were restored to normal by the administration of parathyroid in substance, and it has been suggested that *myotonia paralytica* and *myasthenia gravis* were caused by the alteration of the function of the parathyroid. Further investigation will elucidate the matter concerning these diseases. Present evidence suggests etiological relation with parathyroid disturbance.

Our present knowledge of clinical medicine on the thymus gland is still obscure. Aplasia of the thymus seems very frequently to be associated with other malformations, especially insufficient development of the brain. In case of thymic death, the thymus varies considerably in size. There are, however, certain relations between

the thymus and reproductive glands in the male. The size of the gland increases after the castration in animals and the involution of this gland is retarded.

Thomas Addison was the first to call attention to the disease which is closely associated with change in the suprarenals. More than 30 years later Sir Edward Schafer, now professor in Edinburgh, and Dr. George Oliver discovered that the suprarenals contain a certain substance which effects a marked rise in blood pressure. A little later, Prof. Cybulski, in Cracow, published independently somewhat similar results from physiological investigation of suprarenals. After Schafer and Oliver it was proved by Moore that the action of the extract of the medulla of suprarenals is due to the substance in the cells which stains with chromic salts. Hence it is called *chromaffine* or *chromaphil substance*. This substance was isolated from the medulla of suprarenals in crystalline form by Takamine, as already mentioned. Many interesting facts have been discovered since Addison's time in this connection.

The effect of intravenous injection or of subcutaneous or oral administration of suprarenal extract and the influence of nerves upon the secretion of this gland were made clear. Besides Addison's disease, the suprarenals play an important rôle in several diseases and in correlating the activities of several glands. For instance, in diphtheria and cholera and after injection of diphtheria toxin in animals, the adrenal secretion diminishes or disappears entirely. Hence, in these conditions, subcutaneous injection of adrenalin is reasonably effective. During pregnancy and after castration the suprarenals undergo enlargement, more marked in the cortex than in the medulla. In hypoplasia of the suprarenals a marked change in the testicles occurs, especially in their interstitial cells. The injection of suprarenal extract activates the secretion of the salivary, lacrymal, and gastric glands, and also of the mucous glands of the mouth, gullet, and trachea. Moreover, the secretion of bile is increased and in the liver a rapid conversion of glycogen into glucose occurs, and then glycosuria follows. The correlation between the thyroid and suprarenals will be dealt with later.

Results of investigations on the pituitary body show that the total or complete removal of this gland causes severe symptoms, and death shortly afterwards follows. After the partial or incomplete removal of this gland in young animals there appears a most striking retardation of growth, imperfect ossification, and development of sexual organs, which retain infantile appearance. Besides these, mental dullness commonly appears and the limit of alimentary glycosuria is remarkably raised. From the results of experiments it may be concluded that the posterior lobe or pars nervosa

of the pituitary body has intimate relation to the glycosuria and also to diabetes insipidus. In spite of the general retardation of growth there is marked deposition of fat in subcutaneous tissue, even in adult animals after partial removal of the pituitary body. According to Clark, the average daily number of eggs laid by hens increases after continuous feeding with anterior lobe of pituitary body.

It is well known that three kinds of cells are found in the anterior lobe of the pituitary, i. e., eosinophile or acidophile, cyanophile or basophile, and the principal cell. During pregnancy there appear many so-called pregnancy cells. Commander Koide, of the Japanese Navy, has carried out several series of experiments, at my suggestion, on cats, male and female, and he has found that the eosinophile cells in the anterior lobe appear abundantly in the pairing season and are much more abundant after continuous administration of testicle in substance or in the form of extract, and also of spermin-Poehl, even if it was administered at the interval of the pairing season. The detailed account will be published soon.

I will now discuss some clinical evidence concerning the disorders of the pituitary. According to Cushing, many cases of disorder of the pituitary body, or *dyspituitarism*, start with the enlargement of the anterior lobe, causing excessive function or hyperpituitarism. After some time degenerative changes occur in the enlarged organ: then follows a gradual diminution of secretion or hypopituitarism, and eventually an entire loss of function or apituitarism. The primary enlargement produces diminution of the visual field, owing to the pressure of this enlarged gland upon the optic chiasma. During pregnancy the pituitary body temporarily enlarges, and then occurs weakness of vision owing to the condition mentioned above. The vision is, however, recovered after giving birth to a child. Besides the visual symptoms, certain other symptoms gradually develop. These symptoms are grouped under the term *acromegaly*. In this disease there is an increase in bulk of the pituitary, taking the form of a considerable tumor. It is now recognized that tumors of this gland, which are associated with acromegaly, are in most cases of an adenomatous nature. They may later become of a malignant or of a cystic character and lead to derangement of the pituitary function. Acromegaly is regarded as hyperpituitarism and is usually accompanied with glycosuria or simple polyuria. If the enlargement of the pituitary commences while the cartilages are still unossified, there is a remarkable growth in the length of the long bones and the patient attains an unusual height. This condition is known as *gigantism*. Besides the skeletal changes, the integument is thickened and the growth of the hair over the body increases considerably (hypertrichosis).

On the other hand, there is a specific syndrome of hypopituitarism known as *dystrophia adiposogenitalis*. In this case there is either diminution in size or in function of the pituitary. The symptoms simulate those of animals which have undergone partial removal of the gland. If this disorder occurs before adolescence, the patient remains small in stature, but markedly adipose. Development of the sexual organs is delayed, and they remain in an infantile condition. In the female the menses are irregular or absent and in both sexes there is deficient development of secondary characteristics, both mentally and physically. According to Cushing, most of these cases are due to deficiency of function of the posterior lobe, associated with unusual tolerance for sugar and an excessive assimilative power for carbohydrates, which become transformed into fat and thus produce adiposity. Besides the above-mentioned symptoms, there are subnormal body temperature, low arterial tension, a slow pulse, drowsiness, and torpidity, as well as psychic derangement. But when the hypopituitarism occurs in adults, some of these symptoms will not appear.

Hypopituitarism may result from simple atrophy of the gland, as in the case of infantilism, or may be caused by destruction of the pituitary, such as by a cyst or by the pressure from a neighboring tumor. The symptoms of hypopituitarism vary according as the anterior or posterior lobe of the gland is mainly affected. In the former case the chief effect is upon the stature, but in the latter case there appear adiposity and deficiency of sexual development without glycosuria or polyuria. Certain facts lead us to believe that a dwarfish type of body is associated with the diminution either in size or in activity of the anterior lobe. These changes may commence in infancy or even in the foetus.

An abnormal sexual precocity and early development of secondary sexual characteristics are associated with destruction of the pineal gland by tumor. If the secondary characteristics are intact, there is usually a large number of the interstitial cells in the testicles, although the testicles remain small. Therefore, it is probable that sexual precocity may be closely associated with the development of the interstitial tissue. Moreover, in case of pineal tumors, there appears unusual adiposity, somewhat similar as in the case of hypopituitarism. There are many different forms of obesity, e. g., pancreatogenic, thyrogenic, hypophyseal, epiphyseal, and eunuchoideal, as well as climacteric obesity. In case of hypophyseal obesity the retardation of sexual organs is marked, while in case of epiphyseal obesity, on the contrary, a precocity of sexual organs is prominent.

The results of removal of the testes are well known from olden time in the Orient, and the castration is performed mostly in youth. In such cases the accessory sexual organs, especially the prostate and

minal vesicles remain in an undeveloped condition, and the second-
y characteristics are not seen. In most cases all sexual instinct
absent and the small penis that remains never becomes erect.
uch an individual is know as a *eunuch*, the term applying only to
ie male. As to the castration of young females, definite symptoms
re not yet described. When castration has taken place in later
ears, the penis becomes only slightly smaller, while the prostate
rinks to a great extent. But the sexual instinct is retained for a
ng time; copulation is still possible, and there occurs an ejaculation
f the secretion of the prostate. Of course, there appears a pro-
ounced regressive alteration of the genital apparatus, and at least
partial retrogression of certain secondary sexual characteristics,
id finally a distribution of fat that is similar to that of eunuchs.
his condition is known as *late castrates*. Under the term *eunuch-
idism* we include those individuals who, without being castrated
ntirely, simulate in their appearances the true eunuch type, or at
ast are very similar to it. They are either tall, or if complications
re absent, are at least not stunted in growth. They show the typical
it distribution of eunuchs, and eventually, pronounced obesity. The
piphyseal junctures persist abnormally long. The skeleton dimen-
ons are characterized by an especial length of the extremities,
id, furthermore, the individuals show a definite psychical habitus.
inally, there is found a more or less pronounced disturbance of
evelopment of the genitalia with faulty development of the second-
y sexual characteristics. It is probable that in such cases we have
do with a developmental disturbance beginning primarily in the
xual glands, and especially the interstitial cells, as functional dis-
irbances of the generative glands alone do not lead to eunuchoidism.
here is another type of disease known as *late eunuchoidism*, which
epends on an injury or orchitis, due to syphilis, gonorrhea, or
umps. In this condition there occurs atrophy of the accessory
enital apparatus and retrogression of the secondary sexual charac-
ristics, accompanied by deposition of fat, and certain alterations of
ie psyche. There is another condition known as *hermaphroditism*
id *pseudo hermaphroditism*. The detailed account will be omitted
ere.

The effects of the removal of both ovaries are externally not so
riking as with the similar operation in the male sex. The constant
esult is that the uterus remains small and the external changes
iaracteristic of puberty either do not occur or are greatly modified.
here is absence of menstruation. A tendency to the male type of
richosis is often exhibited.

Castration in animals causes a marked change in the pituitary
ody. There appear after some time large swollen neutrophile cells
i the pars anterior of the pituitary. Some of these cells show more

or less degeneration, while a marked accumulation of hyaline substance is seen in the pars posterior. Sometimes a cyst forms in the pars anterior, containing also hyaline substance.

It is well known that the total or partial removal of the thyroid produces marked change in the pituitary body, but these experiments were not carried out to compare the changes after thyroidectomy and after castration in the same species of animals. According to the results of my own experiments of thyroidectomy and of castration in the same species of animals, in the case of total or partial thyroidectomy the pituitary body enlarges in size. The pars intermedia is thickened. In the pars anterior peculiar large neutrophile, or sometimes basophile, cells, which are more or less swollen, are seen in great numbers. There is also occasionally a cyst containing hyaline substance. This substance is abundant in both the pars intermedia and pars nervosa. In case of castration the enlargement of the pituitary is not so marked. The peculiar, large, neutrophile cells, which are swollen, resemble somewhat those seen in thyroidectomized animals, but in the former case the protoplasm of swollen cells is not so compact; many of them show several stages of degeneration. The hyaline substance is in both cases abundant, and there seems to be no difference in its amount. It was supposed that the pituitary body performs vicarious functions after the thyroidectomy, producing abundant hyaline substance, but the evidence showing that iodine is not present in the hyaline substance of the pituitary, as it is marked in the colloid of the thyroid, does not support the view above mentioned.

Since the discovery by v. Mering and Minkowski, in 1889, that the removal of the pancreas, or even of the greater part of that organ, is immediately followed by hyperglycaemia, leading to severe and fatal diabetes, whereas this effect is not obtained from mere ligature of the duct, in spite of the disappearance of all the alveolar tissue and the complete cessation of formation of pancreatic juice, attention has been especially directed to the islet tissue as the probable source of an internal secretion which serves to regulate carbohydrate metabolism.

Sometime after ligature of the duct the pancreas shows a cirrhosed or atrophied condition and there remains none of the ordinary secreting epithelium except perhaps that of a few remaining ducts, but the organ still contains the islets of Langerhans. Even this atrophied gland is sufficient to furnish the internal secretion which regulates carbohydrate metabolism. If such an atrophied gland is removed diabetes appears. Further, if a portion of the pancreas, whether thus atrophied or not, be successfully transplanted to another site and the rest of the gland be then removed, diabetes does

not occur, although on removal of the graft, it immediately appears. If the pancreas removal is complete the percentage of sugar in the urine is very large even during fasting or on carbohydrate-free diet.

Endocrinology, a branch of medicine of comparatively recent origin has complicated the interrelation of internal medicine, surgery, gynaecology, and especially of psychiatry. There are many facts found post-mortem, some histopathological changes of endocrine organs in case of mental disorders, but at present we are not yet able to arrive at any definite conclusion as to what changes are associated with certain mental disorders. I tried to investigate this subject when I was working at the Claybury Asylum of the London County Council under Sir Frederick Mott. There were several kinds of changes in the endocrine organs in the insane. In cases of dementia præcox I found a marked premature involution of the ovary and a very little spermatogenesis in the testicle. In female cases the thyroid was small. These cases of dementia præcox, which were brought to my examination, were dead through acute illness and there were no signs of chronic illness such as tuberculosis. So I may conclude that these changes, seen in the reproductive organs, are closely associated with mental disorder. Moreover, in cases of confusional insanity following myxœdema there are marked changes of the nerve cells in the brain—e. g., the chromatolysis of nerve cells, especially marked in the Betz cells of the medulla oblongata. This fact may be associated mostly with the changes of the thyroid and also of the other endocrine organs. Further investigation in biochemistry and physiology will elucidate this matter.

There are many facts by which it may be inferred that there is a certain correlation between these endocrine organs. It is, however, rather difficult to speak about this subject in detail in so short a time, so I will merely point out some of the correlations, especially those between the thyroid and the other endocrine organs.

In the female the thyroid becomes enlarged at puberty, during the menses, and during pregnancy. In the young thyroidectomized subject the generative glands are only slowly or imperfectly developed, the resulting condition being specific of sexual infantilism.

Krause and Cramer found that in animals fed with thyroid that glycogen disappears from the liver. But there was no glycosuria, the sugar having been conveyed to the tissues and oxidized. Thyroid feeding causes diminution of the limit for the assimilation of sugar. This may be due either to an increase in the secretion of adrenalin or to a direct inhibitory effect on the internal secretion of the pancreas. According to my experiments and those of my colleague, who has carried out a long series of experiments at my sug-

gestion, there are some interesting facts concerning the pancreas after thyroid feeding in animals.

Before entering into the details of these experiments it will be important to discuss the active principle of thyroid. There are two substances recognized as the active principles of thyroid, i. e., *iodothyrine*, a nonproteid, nitrogenous material, and its protein compound *iodo-thyro-globulin*. The former was prepared from thyroid by Baumann, 26 years ago, and it contains a considerable amount of iodine. The iodine content in the thyroid varies according to the animals. There are seasonal variations in iodine content. In the thyroids of animals, which were kept on the sea coast, the iodine content is higher than in those which were kept in the mountains. The production of the autacoid is promoted by administration of iodides, and there may exist a certain relation between the physiological activity of the gland and its iodine content. But it is a fact that the iodo-thyrine is found to have no action, even though the iodine content is considerable. We are, therefore, still in a state of chaos concerning the true nature of thyroid autacoid, although the iodo-thyrine is supposed to be associated with it. Sir Edward Schafer proposes to apply the term *thyrine* to denote the active principle, whether it be identical with the iodo-thyrine of Baumann or not. It is an interesting fact that after thyroid feeding in both young and adult albino rats of both sexes the alveolar cells of the pancreas multiply considerably, showing several stages of mitotic figures, while the cells of Langerhans' islet show no such figures. At this time the zymogen granules diminish markedly. The animals suffer from indigestion and have poor appetites. After a certain duration of thyroid feeding there occurs enlargement of the pancreas. The effects are the same when fresh or boiled thyroid or waterly extract of the gland is given. The mitotic figures above mentioned are numerous, and in no other cases of intoxication are such numerous cell divisions to be seen. While the cell division flourishes there is pronounced diminution of zymogen granules in the alveoli of the pancreas, causing indigestion, diarrhea, diminution of fat and emaciation. The tests of pancreas ferment during these investigations were undertaken by Dr. Hashimoto, at my suggestion, and it was confirmed that the diminution of pancreatic ferment coincided with the histopathological changes.

Prof. Herring, of St. Andrews, Scotland, has carried out a series of experiments on the cat, and he found that the adrenalin contents of the suprarenals increases after prolonged thyroid feeding in this animal. He found, moreover, that the weight of the organs, especially of the heart of the rat, increases after prolonged thyroid feeding. My colleague, Dr. Hashimoto, has found—

"1. The oral administration of toxic doses of thyroid caused, in ddition to enlargement of the heart, the appearance of myocarditic esions in a large percentage of albino rats; in 90 per cent of the nimals killed during the first and second week, and almost all of nose dying in the second or third week after a daily administration f 0.5 grm. desiccated thyroid.

"2. The myocarditic lesions consisted chiefly in dense accumula- ons of large 'histiocytic' cells (Kiyono), derived from clasmocytes resent in the interstitial connective tissue, in small circumscribed reas between muscle-fibers, or not infrequently in the neighborhood f the blood vessels. The cells may be accompanied by a small or ccasionally rather large number of cells of lymphoid type, at earlier eriods in the sequence of the myocarditic changes. In the later tages they may be associated with fibroblasts, increasing gradually n number, and eventually prevailing over the other types of cell. he muscle fibers may be destroyed in confined areas adjoining larger reas of myocarditic change. The muscle fibers may show, moreover, ight but diffuse degenerative changes, apparently occurring inde- endently of the interstitial changes described above, such as indis- nctness of cross striations, slight tingibility upon vital staining ith carmine, or slight disintegration of the muscle.

"3. The interstitial inflammatory proliferation and the diffuse arenchymatous degeneration described above may both be attributed irectly to thyroid intoxication.

"4. The hearts showing such myocarditic lesions are functionally nferior to normal hearts.

"5. In their histological appearance the myocarditic lesions result- ng from thyroid administration are closely related to those observed y A. Shoff, Tawara, and many others in the hearts of individuals uffering from rheumatism.

"6. The myocarditic lesions occurring in experimental hyper- hyroidism induced by thyroid administration correspond to those n goitre hearts, first noted by Fahr, in the sense that they both onsist of a chronic nonsuppurative interstitial myocarditis. It is vident, therefore, that thyroid administration can cause not only achycardia or hypertrophy, but also myocarditic lesions, all of which imulate the functional and anatomical changes found in human oitre hearts.

"7. The evidence lends support to the theory that the cardiac isturbances associated with goitre are due to thyroid intoxication, nd further to an excess of thyroid secretion."

The detailed description of these experiments was published lately n Endocrinology, the bulletin of the Association for the Study f Internal Secretions.

AVIATION MEDICINE IN THE UNITED STATES NAVY.

By J. F. NEUBERGER, Lieutenant, Medical Corps, United States Navy.[1]

HISTORY OF AVIATION.

Aeronautics is the science of navigating the air. The subject is divided into two separate and distinct branches: *Aviation*, pertaining to flying with heavier-than-air machines, and *aerostation*, referring to navigation with lighter-than-air craft. This distinction is not generally made in the United States Navy, and when we speak of aviation we include the use of both heavier and lighter than air flying devices.

Of all the inventions and activities of man, none possesses a more compelling interest than flight. From the earliest days man appears to have recognized that transportation is the great civilizer and is a prime agent of progress. He daily saw creatures of nature sailing easily and gracefully through the air. The ease with which the bird glided through the atmosphere was puzzling, but that very ease was the greatest stimulant to man's investigations. The manner of bird flight was first studied as manifestly the most promising and hopeful method of conquering the air. Under the influence of constant association with the flying creatures of nature, the ideas of man regarding flight appeared first in the form of legends and myths and in the sculptures of the ancients.

At the beginning of the sixteenth century an Italian alchemist undertook to fly to France from the walls of Stirling Castle, but of

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[1] The writer of this contribution has prepared a series of articles on "Aviation Medicine in the United States Navy" which will appear in forthcoming numbers of the UNITED STATES NAVAL MEDICAL BULLETIN. This article deals with matters not purely medical but necessary for a proper understanding of aviation medicine.

Airships and airplanes differ in construction. Each type presents its own medical problems which must be studied in order to select proper airmen for the various types of machines, as the physical requirements of airmen differ with the type of plane piloted by them.

The author has drawn upon all available sources of information and has tried to give due credit in the text. He is especially indebted to Maj. L. H. Bauer, Medical Corps, United States Army, in charge of the Medical Research Laboratory, Mitchel Field, Mineola, N. Y., for his advice, assistance, and cooperation.

In writing these articles on aviation medicine, the author desires to present his personal experience and observations. No medical officer will fully realize, until he has devoted much study to aviation medicine, the extent of his responsibilities toward the flying personnel, the duties which are required of him, nor the vital and intricate part necessary for him to play in successful aviation. A highly trained, specialized, and efficient medical personnel should be provided for a service accompanied by such dangers and serious consequences. Without it, no efficient air service is possible. It is in connection with problems of training airmen and looking after their physical condition during and after training that the medical officer finds his most important task.

During the writer's tour of service in connection with aviation, it has been his most painful duty on many occasions to hurry to the scene of accident, only to see the lifeless features and mutilated bodies of many of his dearest friends and comrades. Such accidents leave most profound impressions on the memory and they have prompted the writer to prepare this series of articles for the NAVAL MEDICAL BULLETIN in order that interest in aviation medicine may be stimulated with the hope that our researches in this special branch of medicine may procure a greater margin of safety in flying.

FIG. 1.—VIEW OF A TYPICAL NAVAL AIR STATION TAKEN FROM A SEAPLANE.

834–1

834–4

RADIUS OF ACTION AND IS FREQUENTLY USED BY COMMERCIAL AVIATION

ourse was unsuccessful. Leonardo da Vinci, who lived about the ame time, was the first man to approach the subject scientifically. His endeavors were restricted to sketches of wings to fit the arms nd legs. In the seventeenth century one John Wilkins, Bishop of Chester, and founder of the Royal Society of Great Britain, chron-cled and discussed several alleged flights. In 1617, a clergyman named Fleyder deliverd a lecture which so impressed a poor, un-nown monk that he undertook to carry out the theories expounded. His apparatus failed and he became the first victim of accident inci-lent to aviation.

In 1670 Borelle advanced a principle of artificial flying based on he flight of birds. He designed an artificial bird having "a rigid od in front and flexible feathers behind." Followers adhered to his rinciple for almost two centuries. The writings of Sir George ayley (1809–10) show that he was the first to plan dynamic flight n a scientific basis. He planned an airplane built with slightly ob-ique planes, resting on a wheeled chassis, fitted with propellers and teering devices. In 1796 he had constructed a model helicopter—a orm of air craft whose support in the air is derived from the verti-al thrust of the propellers. Nothing of interest regarding aviation as accomplished until 1834 when Hudson made the first known at-empt to construct a full-sized flying craft. His device embodied the arent idea which led to the airplane of to-day. In 1867 Petti-rew designed an ornithopter, or flapping wing machine. It was a cientific apparatus. Thomas Moy in 1879 designed an aerial teamer with a novel engine. It was a partial success.

The dawn of practical aeronautics dates from 1880 when Prof. Samuel P. Langley, Director of the Smithsonian Institution, began a eries of experiments and tests which were destined to have far-eaching results. He was employed by the Board of Ordnance and ortification of the United States Army to construct the "aero-drome," a device of his own invention. Congress appropriated 50,000 for the purpose. Langley's machine was a tandem mono-lane, 48 feet from tip to tip and 52 feet from bowsprit to the end of ts tail. It was fitted with a 50 horsepower engine and weighed 830 ounds. The trials of his invention, two attempts to launch it, were nade on October 7 and December 8, 1903. On both occasions the nachine became entangled in the defective launching apparatus, and as thrown headlong in the Potomac River, on which the launching rials were made. Following the last failure, when the "aerodrome" as wrecked, the press ridiculed the whole enterprise and Congress efused to appropriate money for further experiments.

It is interesting to note that Langley's machine was successfully lown in 1913 by replacing the steam engine with a gasoline motor. He thus gave the world the first successful flying machine and his

labor enabled others to fulfill this dream of all ages. He was the master scientist and will go down in history as "The Father of Aviation." A new airplane tender has recently been named in his honor—the U. S. S. *Langley.*

A period of gliding experiments followed Langley's pioneer attempts. Lillienthal and Pilcher studied problems of stability and equilibrium. Both lost their lives in falls. Chanute developed the movable surfaces in use to-day and made 1,000 flights without accident. From these men the Wright brothers obtained valuable data which enabled them to make the airplane a practical device. The Wrights began their work in 1900, first experimenting with gliders. After having made several improvements in structure, they installed gasoline motors in 1903 and flew a craft for 59 seconds—the first journey of man in a heavier-than-air machine. From then on numerous flights were made by them. These flights were carried on with great secrecy, rumors only reaching the critical and skeptical public.

Santos-Dumont in France, during 1906, attached a gas motor to a torpedo-shaped gas bag fitted with rudders and created the first practical dirigible. He then directed his attention to airplanes and constructed a plane which traveled in flight 220 meters in 21 seconds. The first entirely successful public flight took place in September, 1908, at Fort Meyer, Va., in a Wright machine piloted by Orville Wright. He made three flights, remaining aloft 57 minutes in the first, 1 hour and 3 minutes in the second, and carried a passenger in the third for a distance of 4 miles in 6 minutes. Several days later Wright had an accident; the plane fell and his passenger, Lieut. Selfridge, was killed. Four days later, his brother, Wilbur Wright, made a new record while flying in France, remaining in the air 1 hour and 20 minutes. From that time on aviation progressed rapidly, but at the cost of many lives.

Controversy arose over the respective merits of many features and types of planes, especially in regard to the mono and bi-plane, which was not definitely settled until the late war had demonstrated that the monoplane is only of use as a very light, high-speed machine. In 1911, Glen Curtiss, an American pioneer pilot and inventor, produced a hydroairplane. A short while later he developed a flying boat, and finally created a dual land and water craft. Since then a great number of different types of planes have been developed and manufactured. Progress in aviation has been marked by a great number of accidents and many famous pilots as well as novices have lost their lives. For several years it appeared hopeless to expect such a thing as reasonably safe aerial travel. Pilots were regarded as supermen to be admired for their courage but to be pitied for their foolhardiness. This attitude is still held by many people to-day.

FIG. 5.—H-16 TYPE OF SEAPLANE. IT IS SIMILAR TO THE F-5-L TYPE.

FIG. 6. -NC 4 WHICH FLEW ACROSS THE ATLANTIC OCEAN. NOTE THE THREE ENGINES

836-3

FIG. 7. -HS-2 SEAPLANE, IN FRONT OF THEIR HANGARS READY TO START ON SUBMARINE PATROL.

836–4

In spite of the discouragement which followed the first days of flight, aviation has now passed the critical experimental stage. Powerful aeronautic engines with fine details of perfection in structure have raised modern aircraft to a high standard of efficiency. Aeronautic science and industry have thus been established in full enjoyment of public confidence and appreciation. Aviation was in this stage of its development when the great World War, which was destined to bring aircraft as a weapon to the highest degree of usefulness, began in August, 1914.

HISTORY OF NAVAL AVIATION.

The first practical naval aircraft was constructed by Glen Curtiss in the early part of 1911, and its construction and operation marks the beginning of naval aviation. Prior to this date, both Curtiss and Ely made flights in a land plane equipped with compressed air pontoons in order to land upon the water from the decks of United States battleships which were equipped with specially constructed decks or runways. In November, 1910, Ely made the first flight from the deck of the U. S. S. *Birmingham* over the waters of Hampton Roads. The first naval aviation section in the United States Navy was organized in 1911. It consisted of a few naval officers specially qualified for observation, training, and experimentation along the lines of aviation in its relation to the Navy. This group of officers, included Lieutenants T. G. Ellyson and John Rodgers, United States Navy. Ellyson was the first naval aviator to qualify, Rodgers the second. They received their training at the flying school conducted by Glen Curtiss and the Wright brothers. In 1912, Lieutenant John H. Towers and Ensign V. D. Hobster were similarly assigned, and Naval Constructor H. C. Richardson, Lieutenant Commander H. C. Mustin, Lieutenant P. N. L. Bellinger, Lieutenant Chevalier, United States Navy; Lieutenant B. L. Smith, Lieutenant W. Billingsly, and Lieutenant A. A. Cunningham, United States Marine Corps, qualified. In 1913, Lieutenant M. L. Stolz and Lieutenant R. C. Saufley were added to the list. These men, along with Civil Engineer J. V. Rockwell, Lieutenant K. Whiting, and T. K. Bronson were the pioneers in naval aviation in the United States. This list does not include the names of two men who started their aviation activities in civil life earlier than the naval aviators mentioned, and who, during the war, became naval aviation officers. The first one is Lieutenant Commander J. Lansing Callan, whose record covers the whole span of early experiments, and who, before the United States entered the war, was chief flight instructor to the Royal Italian Navy, and upon our entry into the war became commanding officer of the United States naval air stations in Italy. The

other is Lieutenant Beckwith Havens, who since 1918 has been an officer of the United States Naval Aviation Forces.

The first naval aviators conducted their flights during the winter months at the Curtiss school in San Diego, Calif. The first naval aviation camp was established in 1912 at Annapolis and here flying operations were carried on during the summer. The same year, in the fall, the second camp was started at Guantanamo, Cuba. In these days, aviation camps were essentially different from the naval air stations of to-day. A few portable tents, a good beach, and a sheltered body of water, usually with the cooperation of a naval vessel specially detailed as an aviation ship, comprised the entire equipment. Two or three planes, with a makeshift machine shop made up the material, and an instructor, a student or two, and a few mechanics comprised the personnel. In December, 1913, the camp at Annapolis was broken up and the personnel and equipment transferred to the U. S. S. *Mississippi*, which was stationed off Pensacola, Fla. In January, 1914, a naval air station was erected at this later place, and it became the first fixed naval air station of the United States. Lieut. Commander H. C. Mustin became the first commanding officer. In the beginning of 1914, the U. S. S. *North Carolina* took the place of the *Mississippi* as the naval aviation ship. About this time, experiments in launching planes from battleships were made. Ellyson, at Annapolis, from a float, and then Mustin, from a ship under way, and Billings, at Pensacola, from a barge, operated planes which were projected into the air by compressed-air catapults. Later, others repeated the same experiments. Ellyson, about the same time, made his celebrated flights from a single improvised wire cable running from the shore to the water. One can only wonder at the courage displayed by these men. No test or experiment which gave any promise of value to the Navy was too dangerous for them to undertake.

When we look back a few years, we can not help but marvel at the wonderful progress aviation has made in such a short space of time despite the numerous obstacles encountered. The first special appropriation for naval aviation was made in 1914 in the amount of $14,000. For the following year $10,000 were appropriated; for the year ending June 30, 1916, $1,000,000 were appropriated; for the year ending June 30, 1917, $3,500,000; for the year 1918, $64,133,000 were appropriated; and in the year 1919 the sum of $220,383,119 was appropriated by the Government for naval aviation. Most of the development in naval aviation came within a very short time after funds became available to carry on experiments.

At the time of our declaration of war with Germany, the types of planes in use were either converted landplanes or antiquated

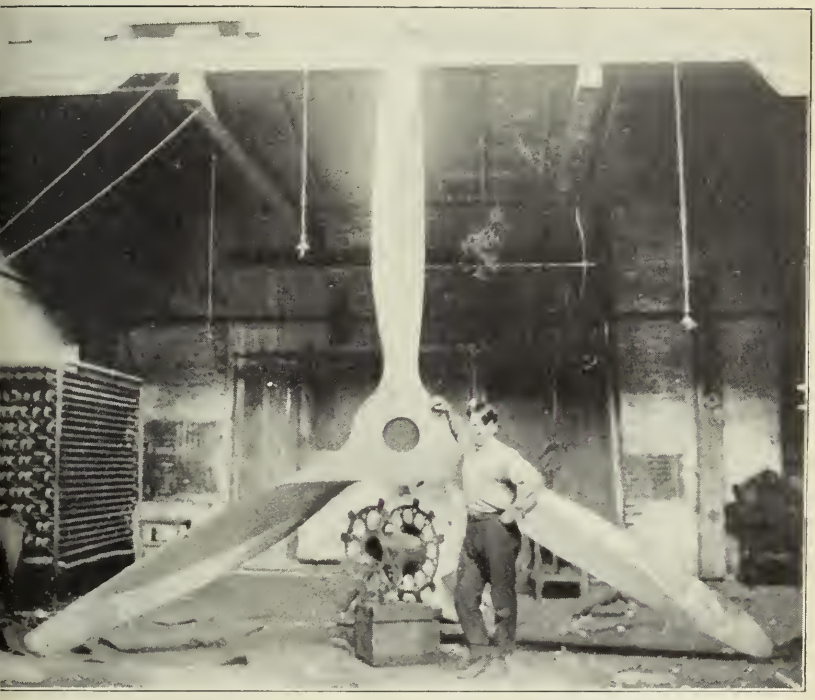


FIG. 9.—ENORMOUS PROPELLER FOR GIANT PLANE.

838–1

838–2

FIG. 11.—THE FAMOUS R-34, THE FIRST DIRIGIBLE TO CROSS THE ATLANTIC OCEAN. NOTE THE GREAT NUMBER OF CYLINDERS CONTAINING HYDROGEN GAS FOR THE AIRSHIP

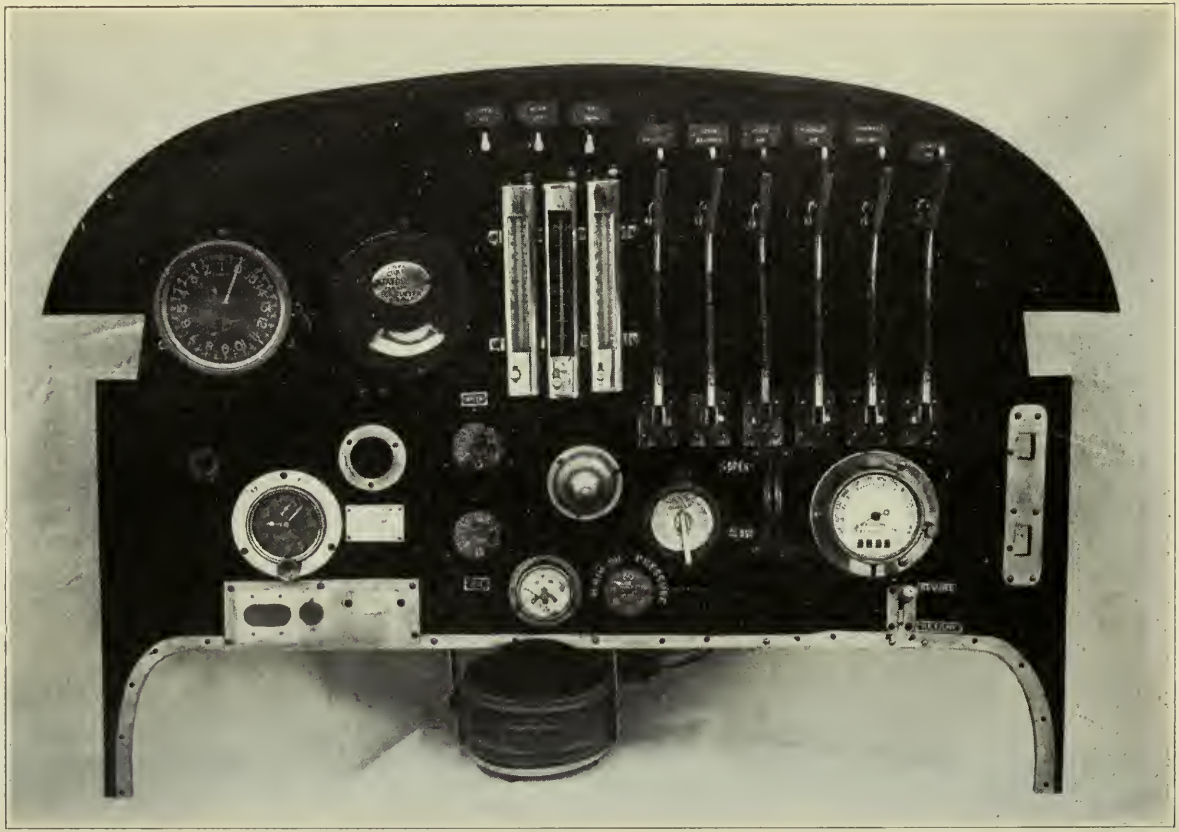


FIG. 12.—THE OPERATING BOARD OF A DIRIGIBLE SHOWING THE NUMBER OF APPLIANCES THE PILOT MUST OBSERVE

ing boats of the original Curtiss design, operating either from ore stations or from an immediately accessible naval vessel. They ere of very light design and could not stand heavy seas.

In the latter part of 1917, improvement in hull design and construction had so far progressed that an effective, practical flying at was turned out for use of the United States Navy. A special ard of officers was sent to France to study the seaplane situation, d upon its return to this country, a special type of seaplane was cided upon and from that time aviation in the Navy gained headay. The type of seaplane selected at that time has been adhered throughout all subsequent operations of the service.

At the time of our declaration of war, the Navy had but one air ation—at Pensacola—and there were but 38 naval aviators and 22 aining seaplanes. In spite of this handicap, the project of planng and organizing naval aviation activities was so speedily and ficiently administered by the Navy Department, that with the gning of the armistice there were in operation 44 naval air staons, located along the Atlantic coast from Halifax to the Panama anal and on the shores of England, Ireland, France, and Italy. o show how efficiently the work of the air stations was carried , it may be cited that during the entire course of the war not single convoy or naval vessel, nor the life of a single American ldier or sailor was lost within the sea area under the jurisdiction f the United States naval air stations on this side of the Atlantic. ccording to French reports, the members of the six active United tates naval air stations in France sighted 27 submarines, attacked 5, damaged 12, and probably sunk 4. During the same period they scorted 477 convoys, besides destroying numerous mines laid by ie enemy. It is stated as a fact that no convoy operating within ieir area was ever successfully attacked by hostile submarines. It possible that in future wars the same problems may not have be dealt with, however, from recent observations one can not help ut come to the conclusion that aviation will play just as large a part, f not larger, in future wars than in the one recently terminated.

CLASSIFICATION OF NAVAL AIRCRAFT.

It is necessary for the medical officer on aviation duty to be amiliar with the different types of airships and their mechanical tructure, in order to understand just what a pilot has to do and hereby to judge the physical and mental qualifications necessary n the make up of a good aviator. Naval aviation is divided into wo branches, namely:

1. Heavier-than-air craft.
2. Lighter-than-air craft.

Heavier-than-air craft comprise the following types:

1. *Airplane.*—A flying machine deriving flotation from pressure under the wings, and up-suction on top of the wings, generated by its own self-contained means of propulsion or by coasting under the influence of gravity. Under this heading belong the different types of seaplanes.

2. *Man-carrying kite.*—A series of box kites on a cable, carrying a basket attached to the cable below the kites for the occupant.

3. *Ornithopter.*—A machine designed to fly like a bird, by flapping of wings.

4. *Helicopter.*—A device deriving sustentation in the air from horizontal propellers.

Lighter-than-air craft include the following:

1. *Common balloon.*—A spherical or pear-shaped gas bag without self-contained means of propulsion. Common balloons are further subdivided into:

(*a*) Captive, when anchored by a cable to the earth or to a ship.

(*b*) Free, when employed to move through the air with the wind.

2. *Kite balloon.*—A combination of lifting and stabilizing bags, stabilizing flaps, and tail cones, habitually employed as captive.

3. *Dirigible.*—(*a*) Rigid, the gas bag being built on an inflexible skeleton work which gives it a fixed form.

(*b*) Semirigid, a keel is introduced to reinforce the nonrigid bag.

(*c*) Nonrigid, the loads are slung directly to the gas bag without employment of stiffening structures within or about the envelope.

From the above it will be seen that there are three types of gas bags or lighter-than-air craft and four types of flying machine or heavier-than-air craft. Of all these seven types, only four are of practical use at the present time. All the lighter-than-air types mentioned are used, while of the heavier-than-air craft only the airplane is successfully employed.

HEAVIER-THAN-AIR CRAFT.

Planes are divided into land and water craft. The term "airplane" is usually applied to designate all land machines, the term "seaplane" to all water flying machines. Strange to say, both types are used in the Navy, and therefore the medical officer must be familiar with the individual planes of either type. The seaplane differs from the land or airplane only in the landing gear—the wheel and skid type of running gear being adapted to land work, and floats, or pontoons, for work on and over the water. The flying boat is a special type of seaplane most extensively used in the Navy at the present time. It consists of a boat body attached to the wing structures, and it is specially designed to carry the occupants and other apparatus, has gun mounts, and performs the function of a float.

FIG. 13.—A KITE BALLOON IN THE AIR.

840–1

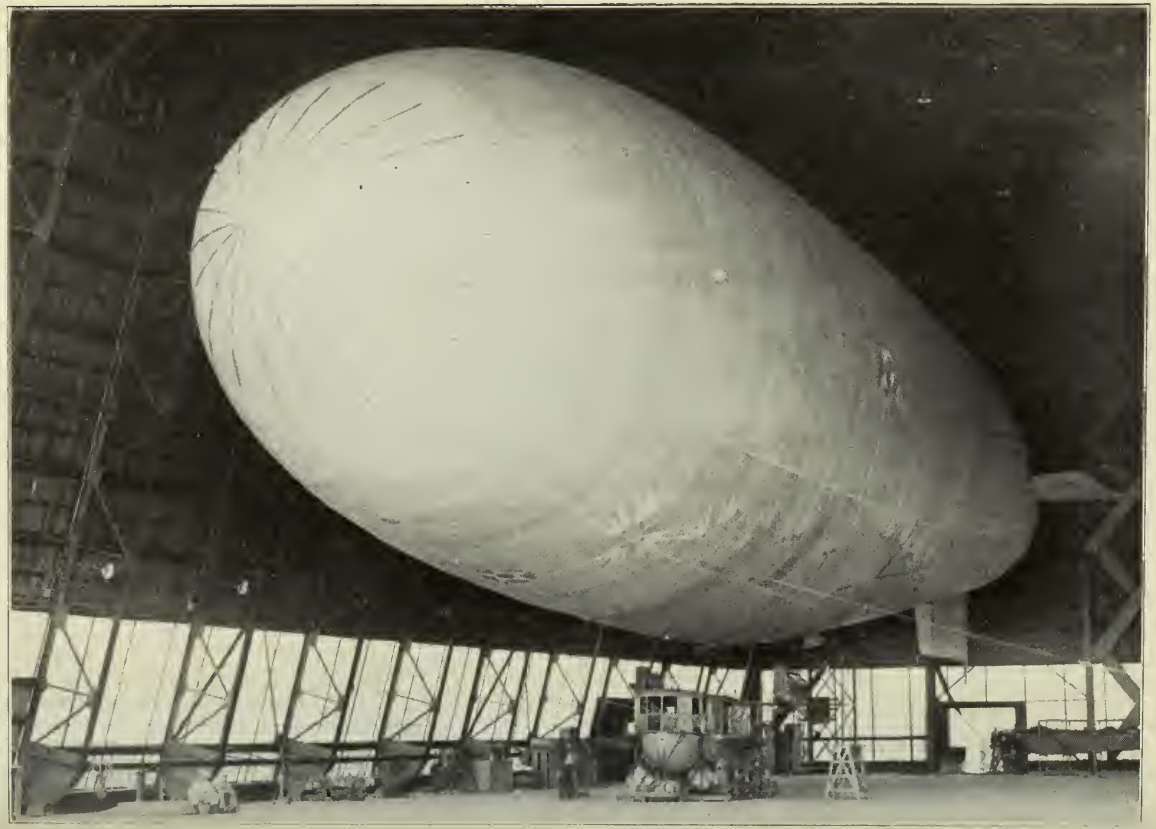
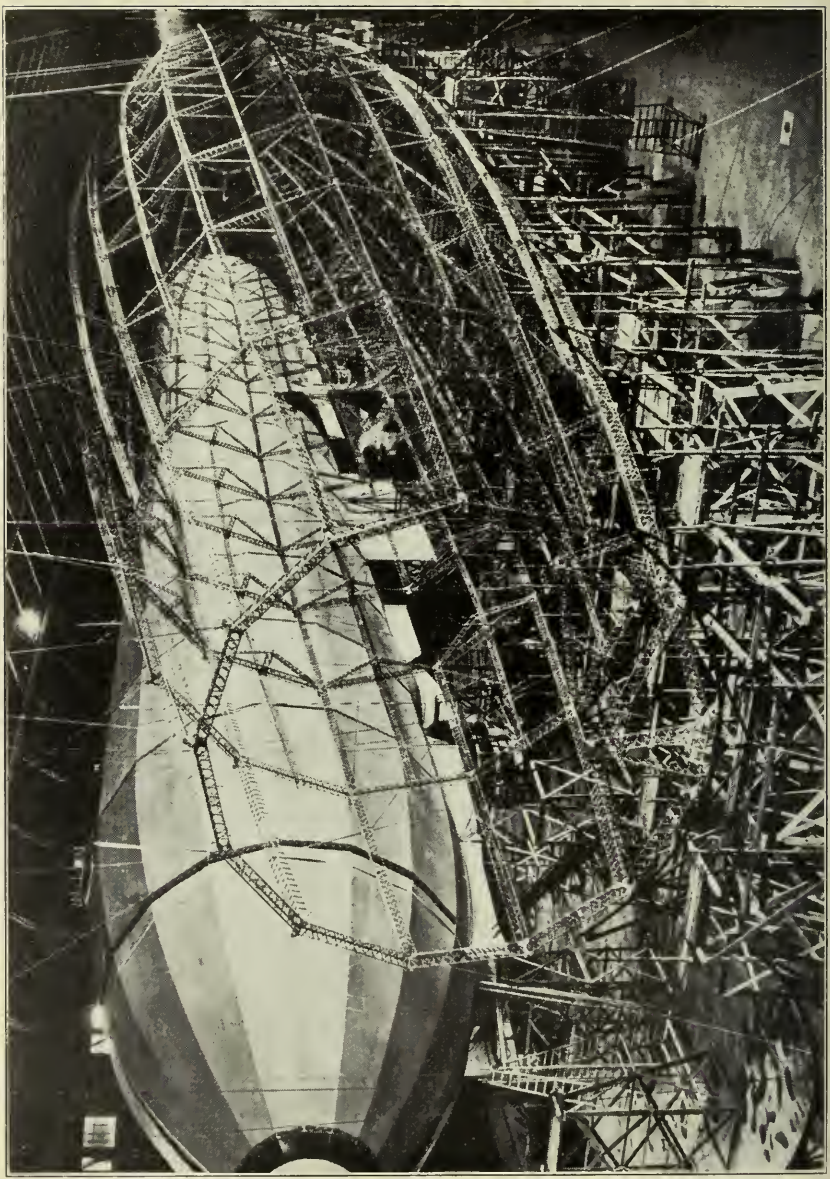


FIG. 14.—D-6 TYPE OF DIRIGIBLE IN ITS HANGAR. NOTE THE GONDOLA CAR ATTACHED BY FINGER

FIG. 15.—DIRIGIBLE MAKING A LANDING. NOTE THE PILOT IN THE FORE PART OF THE CAR MANIPULATING THE CONTROLS. FINGER PATCHES ARE CLEARLY SHOWN IN THIS PICTURE.



840–4

According to the disposition of motive power, seaplanes are either ushers or tractors. Pushers have one or more propellers situated ehind the main plane, tractors have the motive power applied from ne or more screws placed in front of the main plane. The latest type f machines in the United States Navy are combination pushers and ractors as in the *NC–4* type. The following types of seaplanes and ying boats are used by the United States Navy:[2]

N–9.—Seaplane, used for training purposes only. Could be used or scout work. All beginners use this type of plane.

Hs–1, *Hs–2.*—Flying boat, used for the next step in training after student can fly an *N–9* machine. They have been used for scouting nd bombing, and were extensively used by the Navy during the war. hey are being replaced at present by the next two types mentioned.

H–16.—Two-motor flying boat, used for bombing, scouting, and unnery work.

F–5–L.—Flying boat, considered by many pilots the best and most seful seaplane ever designed for the United States Navy. This oat is the favorite with all big boat pilots. It has two motors, has reat flying power and a large radius of action. Used extensively or bombing and gunnery work. It is this type of seaplane which is sed extensively by civilian aviators for passenger service. In ivilian aviation, a part of the fuselage is converted into a cabin, arrying from 8 to 10 passengers besides the crew. It is a very table and steady plane. A strong and husky pilot is required to andle this type in stormy weather. This fact is true of all the larger eaplanes and is an important factor to be considered in the selec- on of students for training in large flying boats.

NC.—Navy Curtiss. This type is familiar to the general reader s it was the *NC–4* which made the first transatlantic flight under the ommand of Commander A. C. Read, United States Navy. They re very large boats, having three or four motors, pushers, and tract- rs. This type is considered an excellent seaplane, having great ying power and radius of action. It can be used for almost any ilitary purpose.

Among the smaller types of seaplanes which are used for special urposes, are the *R–6* and *R–9*, which are used as torpedo planes. hey have two pontoons and carry one torpedo. Other small types f planes used by the United States Navy are those carried on the urrets of ships or by airplane carriers. They are the *Vought*, the *homas–Morse*, the *Martin Bombers*, and the *Curtiss JN* types.

Seaplanes should be capable of rising from the water fully loaded nd running before a wind of 7 miles per hour. An efficient sea-

[2] There are a few planes not mentioned which are still in use in the Navy, but they are d types and no new ones of their design are being constructed. They soon will be ricken off the list, and they are therefore omitted from the discussion.

plane should rise from smooth water with its full load within a brief period of time—1 to 1¼ minutes. The machine should rise from smooth water in calm air in a run of less than 1,000 feet. The craft should be seaworthy, showing no tendency to capsize on a skidding landing or when running on the surface at high speed, with moderate sea and wind abeam. Propellers should be so disposed that they are not unduly exposed to the action of spray while taxing.

Seaplanes must be subjected to vigorous tests to determine their flying qualities. Owing to the great weight of floats and the large area of exposed float surfaces, it is more difficult to obtain good flying qualities in seaplanes than in airplanes. The weights of floats must be compensated for by reducing the load where it can best be spared. New seaplanes should be required to perform air maneuvers which prove them air worthy before they are sent on general service. They should be tested in diving at steep angles and taking steep banks to right and left without loss of altitude. The craft should respond readily to control and have the proper degree of static and dynamic stability, steadiness in disturbed air under various flying conditions, ability to land with a 15-mile wind without danger of nosing over, motors properly tested. Seaplane material must be properly protected from water and dampness. All the above requirements are essential for the safety of the pilot and his crew.

LIGHTER-THAN-AIR CRAFT.

Common balloons.—Those in use in the United States Navy are spherical balloons for training dirigible and station pilots. In case of motor failure or the breaking of mooring cable, the dirigible must be operated as a free balloon. The spherical balloon is used for flights to give this training. One of these balloons with three officers was recently lost in the wilds of Canada, and it was surprising to note how many people inquired what the trip was really for, not being able to understand why anyone should be so foolish as to take a trip in a free balloon. The question was even asked by persons in the military services. As stated above, they are used for the training of dirigible pilots, for in case of motor failure the dirigible has to be handled as a common balloon, and pilots therefore have to be familiar with free ballooning. The knowledge of maneuvering a free balloon can only be acquired by taking flights in them. When these balloons are being operated it is necessary to watch for favorable winds, so that they will not be blown out to sea. Recently three men from the air station in Pensacola were blown out over the ocean and lost their lives. The balloon was found, but no trace of the men was ever detected. This accident is liable to happen from sudden

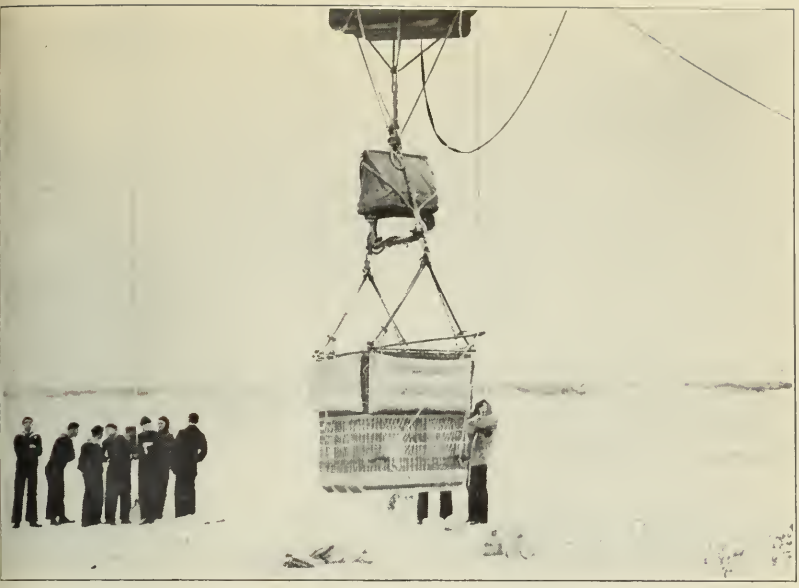


FIG. 17.—THE BASKET OF A FREE BALLOON.

FIG. 18.—A FREE BALLOON ABOUT TO ASCEND.

hanges of wind and air currents. This type of craft consists of a pherical envelope, having a reinforced panel, called the ripping anel, extending vertically from a point just below the pole to the quator. A maneuvering valve is situated at the north pole of the raft. Ropes from the maneuvering valve and the ripping panel ead through the interior of the balloon to the load ring suspended elow the bag. The basket is slung on ropes leading from the net, ithin which the envelope is nested. Passengers, instruments, sand ags for ballast, anchor, and drag rope are carried in the basket; lso emergency rations, carrier pigeons, firearms, safety matches, nd emergency outfit and thermos bottles filled with water and offee. The rations should be sufficient for four or five days. The raft is released and travels under the influence of the wind. The ttainable altitude depends upon the load it carries. Landings are ade by bringing the balloon down to a low altitude and by drop- ing into a long sweep of field by opening the gas bag. If the escent is too rapid all ballast, of whatever it may consist, is thrown verboard in order to check the fall.

Kite or station balloon.—The kite is distinctly a nonrigid craft, nd is a captive balloon, consisting of a gas bag, having a cylindrical hape and carrying some kind of stabilizing bags. The combination s such as to give it weather-vane stability and resistance to pocketing. Pocketing" is the effect of indenting the bag caused by the wind, tendency that seriously reduces the lift and increases the unsteadi- ess of the craft. The cylindrical type balloon is said to be the best ype for captive work. The kite balloon will operate safely under ny weather condition to the extent of a 45 to 50 mile wind. The ommon balloon is useless under these conditions. For naval use the ite balloon serves as a lookout scout, and fire-control station. It is xtremely vulnerable to attack by hostile aircraft and lightning.

The rigid, semirigid and nonrigid airships.—The Zeppelin type is he foremost representative of rigid airships. The gas bag is given rigid form by means of a skeleton framework. The structure is ade of metal and is powerfully built of longitudinal, radial, and nnular channeled members, angle brackets, and braces. Aluminum s the predominating constituent of the metals used. The framework s divided into several compartments, into which hydrogen containers re secured. The entire structure is covered with a heavy waterproof loth, so as to provide an air space between the outer covering and the nterior gas bags. The gondolas (cars) and other loads are rigidly ttached to the framework. The latest model of super-Zeppelin is 40 feet in length, 64 feet in diameter, weighs 33 tons, and displaces ,100,000 cubic feet of air. It has a cruising radius of about 1,000

miles. A ship of this type, the *ZR-2* (*R 38*), was constructed fo the United States in England. It was much larger than the ship de scribed above, having a displacement of about 2,000,000 cubic feet an a cruising radius of about 3,500 miles. It was intended that this shi be flown to the United States, but, unfortunately, on August 24, 1921 during a trial trip an accident occurred which resulted in the deat of practically the entire crew and the total wreck of the ship.

The semirigid and nonrigid types.—These types have not enjoye the success of the rigid type up to the present time, although the non rigid types are still extensively used in the United States Navy. Th nonrigid type differs from the semirigid only in that the beam i omitted, weights being slung directly from the belly band or suspen sion patches around the gas bag. The shape of these ships is sus tained by internal gas pressure. Formerly a network of rope wa attached to the envelope to carry the loads, but the best suspensio practice at present is to employ either a belly band or finger patches A stiff beam is slung below and parallel to the bag and the loads ar secured to this beam in the semirigid ships.

PYELONEPHRITIS: A CRITICAL REVIEW OF ONE HUNDRED CASES.

By O. C. Foote, Lieutenant Commander, Medical Corps, United States Navy.

This study is based on a critical review of one hundred cases of pyelonephritis, in which a complete urological investigation has been carried out. The cases studied have been those which are commonly referred to as coming within this entity. Pyelonephritis occurring in children, however, has been excepted; and infections occurring secondary to stone, urethral obstruction, prostatic obstruction, or in association with cerebrospinal syphilis have not been included. This narrows the problem down to the interesting speculation as to the etiology of infections occurring in the kidney secondary to the following causes: Obstructions in the ureter and obstructions caused by malpositions of the kidney, or malpositions of the pelvic organs in women; constant insults to the kidney as the result of gastrointestinal disturbances, and the accidents of infection which may occur here as well as elsewhere in the body.

Sex.—Sixty-nine per cent of the patients were females. This preponderance of females is too striking to be accidental and must necessarily depend upon factors peculiar to the female sex, such as pregnancy, malpositions of the uterus and bladder, and infections of the bladder secondary to operative procedures on the pelvic organs. In reviewing the cases of pyelonephritis incident to pregnancy, it was found necessary to recommend abortion in four of the patients be-

use of extreme toxemia. In 17 others infection had occurred in the rly months of pregnancy and had been firmly established at term robably by long months of interference with urinary drainage from e kidneys. In this connection a few pyelograms made of pregnant omen showed considerable dilatation of the ureter. It would be teresting to know how constant a condition this might be in preg- ncy and whether it might not be responsible, not only for infec- n of the kidney, but for other toxemias of pregnancy.

Pelvic operations are undoubtedly responsible for much pyelo- phritis. In this series the condition was associated with oöpho- ctomy in seven cases, hysterectomy in two cases, with cystocele d perineorraphy in one case, and with a suspension operation in other case. Cystoscopic inspection of the bladder after hyster- tomy generally shows the presence of most intense congestion, and e bladder in this condition must be most susceptible to that in- tion which is believed in certain instances to be the source of in- tion in secondary kidney involvment. Catheterization of the nale bladder after pelvic operation has long been held responsible r the undoubted occurrence of infection; but if this is the mode which infection is introduced, it is only because the bladder has en rendered extremely susceptible by injury, and it would seem that a result of this hypersusceptibility, it might well become infected other ways than by the introduction of the catheter. It has not en sufficiently recognized that the suspension operation may be the use of pyelonephritis. In the descent of the uterous the patency of e ureter is oftentimes insured by the slowness with which the scent occurs. The ureter gradually assumes a new position and w relationships. When the uterus is now lifted a considerable stance, and put again into its normal position, the ureter may be structed, and sufficient stasis may occur to result in infection.

From these observations, one must admit that in every case in ich pelvic procedures are contemplated, procedures which will ult in trauma of the bladder, or in which the uterus is to be fted in its position, the patient should be given, previous to the eration, sufficient urotropin to render the urine antiseptic.

Age.—The youngest case in this series on admission was a woman years old. The oldest was a woman 66 years of age. The largest mber of cases (18) occurred between the ages of 40 and 44 years. The following table shows the ages of patients on admission:

m 15 to 19	2	From 45 to 49	9
m 20 to 24	10	From 50 to 54	11
m 25 to 29	8	From 55 to 59	9
m 30 to 34	13	From 60 to 64	6
m 35 to 39	11	From 65 to 69	3
m 40 to 44	18		

From the above table it will be noted that few cases were found occur in youth, most of the cases occurring in early childhood, t rest during adult life.

Pyelonephritis is notoriously common in children and, in the lar majority of cases, most spontaneously recover. In the series the were three cases of pyelonephritis which had persisted in childho for a sufficient length of time to result in death in one of the patien and marked deterioration in the health of the other two. It is this type of case that pelvic lavage should be carried out.

Type of infection.—The right kidney was infected in 18 instance the left kidney in 22 cases, and in 60 cases the infection was bilatera Eighty-four per cent of the cases showed a bacillus infection an 16 per cent a coccus infection. Most of these coccus infections showe much more involvement of the bladder than the bacillary infectio did and were more frequently associated with surface ulceration an hematuria. They appeared to be more resistant to treatment.

Pain.—It is astonishing how severe an infection of the kidney ma be present without pain of sufficient severity to cause distress. Th large majority of the cases complain of bladder disturbances onl and it is the absence of pain in the renal regions which has in th past led to so marked a chronicity in this type of infection. Eighty nine of the cases in this group presented bladder symptoms, leavin a small percentage of 11 in which there were no urinary disturbance Cases of severe infection of the kidney are sometimes subject to ren pain, usually aching in character, and which may be typically renal i distribution. That is to say, may be referred to the region of th superior lumbar triangle.

In other instances the pain in the back may be associated with pai in the upper abdomen or in the region of McBurney's point and i a corresponding position on the left side. There are still other in stances in which infection of the kidney may be associated only wit abdominal pain, and when this pain occurs in the region of the ap pendix it may be extremely difficult to differentiate between acut infection of the right kidney without appendicitis and acute infec tion of the right kidney in association with appendicitis. In eithe case there is fever, leucocytosis, pain in the region of McBurney' point, and in the actual absence of appendicitis we have observed slight degree of rigidity and a tendency toward muscle spasm. Th respiratory wave as a rule sweeps over the abdomen when infectio is purely renal, but cases of this type are extremely difficult to differ entiate, and one should bear on the side of unnecessarily removin the appendix rather than otherwise.

Urine.—Ninety-five per cent of the cases showed pus in centri fuged specimens of urine. Not all cases of pyelonephritis at al

mes show pus, and even prolonged observation in some instances ould show only an occasional pus cell, in spite of the large num- ers of bacteria. It is perhaps the absence of pus in all cases of cteriuria which has led to the belief that one of the functions of e kidney is to excrete bacteria. The idea that the kidneys excrete cteria as a normal function is probably fallacious, nor does it em that any such function could be carried out when one considers e method in which urine is excreted. When a ureteral catheter- ed specimen of urine contains bacteria, the kidney is the seat of definite infection. It is interesting to note that the urine may be len with bacteria and yet show few or no pus cells. This leads the importance of obtaining direct slide smears immediately after theterization, for in the absence of pus, if the specimens are kept r any considerable period of time, it is totally impossible to tell ether the infection came from the kidney or whether it is the ult of contamination and multiplication of contamination which s been picked up in passing the ureteral catheter through the in- ted bladder. Direct slide smears are of far more value than cul- es for the very reason that cultures are nothing more than a ltiplication, many times often of a misleading contamination. e can arrive at definite conclusions only by immediate study of shly collected specimens. Other cases have been observed, and s observation is not limited to our own studies in which direct le smears show bacteria, but bacteria which will not grow on the linary media.

Macroscopically clear urine may be heavily laden with infection en centrifuged and stained, and no urinary examination is of value unless a freshly catheterized specimen in the female and shly voided second-glass specimen in the male are immediately trifuged and the sediment stained for bacteria. Fifty-nine per t of the cases showed blood in the urine. Albumen was present 65 per cent of the cases, and infection was demonstrated in all hem.

n connection with the clinical studies of the urine and pyelo- hritis, some interesting cases have been observed of which one ds very little. In some instances in which a typical picture of enchymatous nephritis was present, with large amounts of al- nin in the urine associated with edema, catheterized bladder ne, in addition, showed many bacteria. In some of these cases body had been searched throughout for various types of focal ction, and, strange to say, a bacteriologic study of the urine been neglected. It is possible that infection had occurred in ciation with a typical parenchymatous nephritis; but if this is case, infection of the kidney would seem to have played a large

part in the renal destruction, for in one of the cases showing a heav cloud of albumin, the left kidney had been virtually destroyed, an the right reduced considerably in its functional capacity. The kid ney itself should be more often considered as a source of its ow focal infection, if focal infection bears any great relation t nephritis.

Other considerations.—Pyelonephritis may be extremely latent an is oftentimes associated with gastrointestinal disturbances, usuall distension of the abdomen with gas, or mild forms of indigestio This association has led to the belief that pyelonephritis may b due to no fault of the kidney itself, but to constant storming o the kidney by bacteria as a result of some type of intestinal stasi The theory is supported by the considerable improvement noted a times following catharsis, but infections in general tend to show im provement following catharsis. It is also supported by the fr quency of bilateral infection, but infection might well occur on th second side as a result of ascending infection. It is further sup ported by the frequency of gastrointestinal disturbances in associa tion with kidney infection, but in such diseases of the kidney a hydronephrosis, tumor and stone, unassociated with infection, it i not uncommon to find gastrointestinal disturbances of a simila character. If kidney infection were often dependent upon gastr intestinal stasis, local treatments of the kidney would not often prov successful or lasting, and it may be that the persistent types o infection in which no stasis of the urine is demonstrated may d pend upon constant insults to the kidney through intestinal stasi

A good many cases of pyelonephritis are undoubtedly depender upon stasis of the urine as a direct result of obstructions somewher along the ureter, and dilatation of the ureter is of undoubted valu in treating these particular conditions.

Conclusions.—Pyelonephritis occurs more frequently in femal than in males, due to pregnancy and gynecological procedures. Gyn cological procedures should be preceded by urinary antiseptics, an these should be continued during convalescence.

Pyelonephritis is extremely common in childhood, skips youth and again appears throughout life. From this it is concluded tha the large majority of cases occurring in children spontaneously r cover. There is an occasional case in which recovery does not occu and the child's resistance is so lowered as to render it susceptible t other infections which prove fatal. Children in whom pyelonephriti exists for a long period of time should be given the benefit of pelvi lavage. There is practically no difference between the right kidne and left kidney in susceptibility to infection.

Clinical observations of marked bladder disturbances and infe tion of the urine subsequently followed by pain in the renal region

d fever, has led to the conclusion that ascending infection may cur and probably often accounts for the bilateral nature of the sease.

Pyelonephritis is most often emphasized by bladder disturbances one, but may be associated with pain, abdominal in type, and when sociated with acute infection may be extremely difficult to differtiate from urinary infection associated with appendicitis. Not all ses of pyelonephritis show pus in the urine. Direct slide smears e of more value than cultures. There are infections of the urinary ict other than tuberculosis which in the absence of urinary antiptics will not grow on ordinary media. It is not one of the functions the kidney to excrete bacteria, and the finding of bacteria in dney urine is evidence of a pathological process in that kidney. ironic nephritis associated with infection of the kidney is not unmmon. The presence of large amounts of albumen in these cases s, in some instances, led to exhaustive studies of other portions of e body for foci of infection, with total neglect of the kidney itself a focus of infection.

Persistent cases of pyelonephritis in which no stasis is present ay have as their cause gastrointestinal stasis. Pyelograms should made in cases of persistent pyelonephritis to demonstrate the sence or presence of ureteral stricture.

RECURRENT HERNIA.

By Lucius W. Johnson, Lieutenant Commander, Medical Corps, United States Navy.

Estimates of the number of hernias that recur after operation ary between 6 and 20 per cent and many writers on the subject press the opinion that in operations on people over 14 years old currences are nearer to 20 than to 6 per cent. Of 250 hernias hich we have recently operated on in the naval hospital, Mare sland, exactly 10 per cent had recurred after a previous operation. f these, 5, indicated by stars in the table, recurred after operaon by the writer. Recurrence after herniotomy is common enough make it the duty of all of us who operate on hernias to seek out e causes of recurrence so that we may avoid them.

Twenty-two of the hernias in this series were inguinal and these ere evenly divided between the right and left sides, while all three f the femoral hernias were on the right side. The inguinal hernias ere also evenly divided as to type, 11 being originally direct and 11 iginally indirect. Of the 11 which were originally direct, 10 reurred as direct hernias and 1 as indirect. Of the 11 which were iginally indirect, 8 recurred as indirect and 3 as direct.

Series of recurrent hernias operated upon at Naval Hospital, Mare Island.

Case.	No.	Previous admission.				Present admission.			
		Region.	Number of operations.	Time before recurrence after last operation.	Type of last operation.	Age.	Condition found.	Type of repair.	Comment.
F. M.	20	Right inguinal, direct.	1	18 months	Cord not transplanted	21	No definite sac, bulging of all layers of wall.	Imbrication of fascia and muscles under cord.	Tissue-paper belly.
P. S. R.	44	Left inguinal, direct.	1	4 years	Cord transplanted	21	No definite sac, internal ring O.K., split in muscle at external ring.	Peritoneum tucked, muscle sutured, fascia imbricated.	Very poor tissues.
H. S.	68	do	1	2½ years	Cord not transplanted	19	Large mass of preperitoneal fat, no definite sac, bulging of all layers.	Fat removed, cord transplanted, fascia imbricated.	Fat and flabby.
S. H.	75	Right femoral.	1	5 years	Sac removed, ring closed.	28	Sac contained omentum, large femoral ring.	Sac removed, ring closed by purse-string suture.	Severe infection, phlebitis.
	*231	do	2	6 months	do	28	Diffuse bulging of scar	Inguinal route, sac removed, scar excised, ring closed.	No recurrence after 18 months.
G. K. L.	124	Right inguinal, indirect.	1	5 years	Cord not transplanted	18	Large sac extending to scrotum.	Sac removed, peritoneum tucked, cord transplanted.	Paralysis of oblique muscles following appendectomy when 12 years old.
	*445	Right inguinal, direct.	2	9 months	Bassini	19	Direct hernia opposite external ring.	Sac infolded, rectus sheath used to reinforce.	
L. C.	187	Right inguinal, indirect.	1	6 weeks	do	34	Large sac	Cord not transplanted, fascia imbricated.	A sac was removed at each operation.
	187	Left inguinal, direct.	1	3 weeks	do	34	do	do	A large sac was found at each of 3 operations.
	*401	do	2	9 months	Cord not transplanted	34	do	Bassini	
P. J. E.	215	do	1	3 months	do	22	do	Cord not transplanted, fascia imbricated.	Congenital sac found.
F. L. M.	216	do	1	4 months	do	20	Small indirect sac, large direct sac.	Bassini	No recurrence after 15 months.
J. M. K.	228	Right inguinal direct.	4	11 months	Large sac removed, cord transplanted.	45	Large scar area stretched, very poor tissues.	Scar tissue removed, rectus sheath used to reinforce, cord transplanted.	Recurred after8 months, by relaxation of whole belly wall.
J. G. F.	240	Right inguinal oblique.	1	1 month	Sac removed, cord not transplanted.	30	Small direct sac	Bassini	Tissue-paper belly.
L. L. L.	246	Left inguinal indirect.	2	First, 3 weeks; second, 3 months.	Bassini	23	Sac very adherent, large sac.	do	No recurrence after one year, has right inguinal hernia.
C. R. B.	329	Right inguinal direct.	1	11 years	do	33	Small sac, recurrence due to stretching of scar.	do	Tissue-paper belly.

P. P. B.	420	.....do.....	1	12 years.....	Cord not transplanted...	35	General bulging, no distinct sac.	.....do.....	
		Left inguinal direct.	1	8 years.....	.....do.....	35	.....do.....	.....do.....	
	*526	.....do.....	2	2 months.....	Bassini.....	35	General bulging, large sac..	Sac removed, rectus sheath used to reinforce, cord not transplanted.	Very fat and flabby.
C. E.....	462	Right femoral.	1	2 weeks.....	Ring closed.....	45	Femoral and indirect inguinal sacs.	Inguinal route, sacs removed, Cooper's ligament sewed to Poupart's.	Tissue-paper belly, inguinal and femoral hernias also on left side.
A. W. L...	496	Left inguinal indirect.	1	10 months.....	Large scrotal sac removed, cord not transplanted.	20	Long, narrow sac containing omentum.	Sac removed, cord not transplanted.	A new sac.
E. H. W...	510	Right inguinal indirect.	1	14 months.....	No sac found, cord not transplanted.	23	Congenital scrotal sac.....	.....do.....	Congenital sac not found at first operation.
G. D.....	*556	Right inguinal direct.	1	16 months.....	Large thin sac removed, also much fat, cord not transplanted.	50	Bubonocele, direct, large masses of fat.	Fat removed, sac plicated, cord transplanted.	Large fatty masses at external ring, both operations.
D. A. C....	559	.....do.....	1	3 months.....	Bassini, infection followed.	40	Intestine adherent to skin, thin scar.	Reconstructed all layers of wall.	Recurrence due to infection.
J. N. H....	574	Left inguinal indirect.	1	Recurred after a fall 18 months.	Cord not transplanted...	24	Small, thin sac, external ring very large.	Sac removed, cord not transplanted.	Recurrence due to a severe fall.

The cause of recurrence is not always clear and, though in each case we studied the condition carefully at operation and considered whatever data were available concerning the previous operation and the subsequent history, the causes here assigned must be considered as probable and not absolute causes. Nine of the cases were of the "tissue-paper belly" class and these were direct hernias with diffuse bulging of all layers of the abdominal wall in the inguinal region. Nine cases appeared to be due to faults in technic, improper treatment of the sac, or else a type of operation not adapted to the case. Three were due to infection and sloughing, leaving a weak scar. Two recurred because of stretching of excessive scar tissue which was due to some other cause than sepsis. One was due to paralysis of the oblique muscle fibers following appendectomy and prolonged drainage. Here the first operation was technically correct but not adapted to the case. In one case a traumatic hernia was caused by a severe fall after a perfectly satisfactory herniotomy.

Type of operation.—On first thought this would seem to be the most important factor in the success of a herniotomy but, after a careful study of each case at operation and of the tabulated findings, I am unable to draw a conclusion which favors one type of inguinal operation rather than another for ordinary hernias. The greatest difference in the various operations is between those in which the cord is transplanted and those in which it is left in its normal position. Here, again, one can find no evidence in this series which favors either type. In nine of the inguinal hernias the cord had been transplanted at the former operation; in 13 it had not been transplanted. In our repairs we transplanted the cord in 12 cases and in 10 we did not.

When the patient is one of the well-developed, robust young men that we like to think are typical of the men in the Navy, it is probable that the kind of operation is of no importance. Any of the generally accepted procedures will probably be successful if the technic is correct in all its details. But this is not true of another group with which we have become familiar since the beginning of the World War. These are the men who have held clerical or other sedentary positions and have reached maturity without ever developing their muscles or becoming inured to hard physical work. Attracted by the high wages of labor during the war, thousands of men of this class left their clean-collar positions and joined the ranks of the manual workers. In a hospital which serves a large industrial navy yard, as this one does, this class provides a very large number of the hernias and also many recurrences after operation. We have come to know them as the "tissue-paper bellies," and in many cases it would tax the ingenuity of the most experienced surgeon to find

reliable muscle and fascia with which to construct a strong abdominal wall. Frequently one will find the conjoined tendon attached to the rectus sheath 2 or 3 inches above the spine of the pubis, where it is of little use in a herniotomy.

One should approach cases of this sort, as he should approach all recurrent hernias, with an open mind and not prejudiced in favor of any particular type of operation. He should determine which procedure to employ only after he has located and cleared the various muscular and fascial layers and estimated their value in the reconstructed wall.

We are accustomed to transplant the cord only in direct and large indirect hernias. When the transversalis fascia is well developed, as in small indirect hernias, and when the oblique muscle is strong and comes down easily to Poupart's ligament, it is not necessary to transplant. The transversalis fascia should not be neglected in direct or large indirect hernias. It lies beneath the muscles and is thickest in the lower abdomen and inguinal region where its fibers may be seen as they fuse with the peritoneum to form the true internal ring.

Rectus muscle fibers or a flap of its sheath will be found useful in the repair of many of the large hernias with poor tissues. The conjoined tendon is inserted into the outer and anterior surfaces of the rectus sheath; therefore any incision into the sheath should be made posterior to the tendon so that the oblique muscle fibers are not weakened. The sheath may be cut posterior to the tendon and the fibers of the rectus sewed down to Poupart's ligament, or a flap may be cut from the posterior sheath for this purpose. In either case, bring the internal oblique down to Poupart's ligament over the transplanted tissue. Rarely, it may be necessary to go below Poupart's ligament and bring up a flap of the fascia lata or the tendor vaginæ fermoris to cover the weak space.

Treatment of the sac is the most important step in prevention of recurrence. It should be ligated so close to its base that there is no puckering of the peritoneum after its removal. If this is not possible it is well to bury the stump by a few mattress sutures through the peritoneum and transversalis fascia. This is especially important when the sac has a broad base, as in most direct hernias. One should always bear in mind the possibility that there is more than one sac. It is an excellent rule always to examine the femoral and inguinal rings from within the peritoneum and make certain that all are firmly closed. Potential hernias are frequently discovered and future embarrassment avoided by correcting them.

Transplanting the stump of the sac is probably of no value and may be detrimental. As one usually sees it done, the stump of the

sac is attached high up to the muscle and the muscle then pulled down to Poupart's ligament, the stump being drawn down with it to approximately its original position. The only effect of this is to prevent the desired retraction of the stump and to produce a cone-shaped fossa in the peritoneum which favors recurrence.

If the stump of the sac retracts well out of sight behind the muscles it is a favorable sign. If it lies visible in the ring it is too long and should be ligated at a higher level. If the stump is transplanted, care should be taken to see that it goes up beneath the transversalis fascia, otherwise the effect is to stretch the internal ring and weaken it.

In the repair of femoral hernias the type of operation is of great importance. Removal of the sac and closure of the femoral canal from below does not always secure anatomical correction or prevent recurrence. It is much more satisfactory to use the inguinal route, pull the sac up from the canal, remove the sac and close the canal at its upper end by sutures passing through Poupart's and Cooper's ligaments.

Can the sac be reproduced after being removed? Some writers assert that all sacs are congenital and never reform after being removed; others maintain that a new sac may be formed. In this series there is definite evidence that a sac was removed at the first operation in several cases, but the possibility that there were multiple sacs, some of which were not removed, can not be excluded. In one case (187–401) a large indirect sac was removed at each of three operations on the left side and at each of two operations on the right side. In another case (574) the hernia recurred as a result of a severe fall and the scar on the peritoneum where the sac had been removed at the first operation was found halfway down the side of the new sac. Apparently a new sac may form after one has been removed.

In three cases no sac had been found at the first operation, and in all a distinct congenital sac was found at reoperation. Such occurrences may be avoided by opening the peritoneum and examining all the hernial sites from within. Frequently one will find a pouching of the peritoneum, a potential hernia, which should be corrected by a purse string and a few mattress sutures through the peritoneum and the transversalis fascia.

Many hernias are seen which have the tip of the sac capped by a wedge-shaped mass of fat which, I believe, by constant pressure, helps to spread the fibers of muscle and fascia and favors development of the hernia. Whether or not the fat acts in this way has been a subject of controversy for years; but one sees so many cases in which this wedge action is apparently going on that it is worth while to remove all fatty masses in the region of the hernia.

Stretching of scar tissue is a very common cause of recurrence. It is important to avoid those things that produce scar tissue. Sepsis is the chief of these and the prime essential in herniotomy is asepsis. Hematomas are ultimately replaced by scar tissue, so careful hemostasis is important. Tying the sutures too tight results in necrosis of the tissue and its replacement by scar tissue. They should be tied just tight enough to keep the tissues in contact until they grow together. To avoid this strangulation of tissue some operators use only No. 1 plain gut throughout the operation, as it breaks if too much force is used. Their results are as favorable as those who use heavy kangaroo tendon. Other operators use no sutures in small hernias with well developed muscles, relying entirely on proper disposal of the sac.

One should never feel too complacent after operating on a recurrent hernia, or too critical of the previous operator even if the reasons for his failure seem clear. Such hernias have a most embarrassing habit of recurring again, even though every step is carefully done and every precaution taken.

CONCLUSIONS.

Any of the accepted operations will be successful in the young and robust. In others, the operation should be chosen to conform to the requirements of the individual case.

Proper disposal of the sac is the most important factor in preventing recurring. Other essentials are asepsis, hemostasis, and avoidance of scar tissue.

MENINGOCOCCUS SEPTICEMIA.[1]

By W. A. Bloedorn, Lieutenant Commander, Medical Corps, United States Navy.

The occurrence of a septicemia caused by the meningococcus is becoming more frequently met with in recent years, and in the absence of a meningitis may easily be overlooked until the late development of meningeal involvement gives the clue to the nature of the infection.

As a rule, these cases, particularly if left untreated, will eventually develop localizing signs either in the meninges, endocardium, or joints, while if the character of the disease is recognized and specific serum treatment instituted at an early date these complications may frequently be avoided and a favorable outcome more often obtained.

Primary meningococcus septicemia is still comparatively infrequent, and despite the claims of some observers that all cases of epidemic cerebrospinal meningitis present an early bacteremia, the

[1] From the American Journal of the Medical Sciences, Dec., 1921, No. 6, vol. clxii, p. 881. From the Division of Clinical Medicine of the U. S. Naval Hospital, Annapolis, Md.

fact remains that when the case comes under the observation of the attending physician the signs of meningitic involvement are usually present.

Nevertheless, a primary meningococcemia may exist for weeks or even months, either with or without localizing signs, and, depending on the type of case, may closely simulate in its clinical course other acute infections, particularly malaria, acute rheumatic fever, or endocarditis. The true nature of the infection may be revealed by the necropsy report, by the development of meningitis, or by the demonstration of the organisms in the blood by means of blood cultures. The importance of keeping this fact in mind in atypical cases with doubtful etiology can not be overestimated. The routine practice of taking blood cultures in these conditions should be insisted upon. The cultures should be taken repeatedly and over considerable periods, and should be incubated for at least 72 hours before being pronounced negative. Baeslack recommends that negative cultures be kept under observation for an additional five days before being discarded.

The meningococcus intracellularis was identified in 1887 by Weichselbaum, who established its specific relation to epidemic meningitis.

The first case of meningococcus septicemia was reported in 1899 by Gwyn. This case was one of epidemic meningitis complicated by acute arthritis, and the meningococcus was isolated from the spinal fluid, the synovial fluid, and the blood.

In 1901 the meningococcus was demonstrated in the blood of two meningitis patients by Cochez and Lemaire. Since that time meningococcus septicemia has been reported by Jakobitz, Martini and Rohde, Lenhartz, Marcovitch, Robinson, and Duval. The meningococcemia in all of these cases was associated with meningitis.

In 1905 Elser, in examining the blood of 41 cases of cerebrospinal meningitis demonstrated the meningococcus in 10 of these cases. In most of these cases some form of extrameningeal lesion was present. The sites of these complicating lesions usually were the endothelial-lined cavities, such as the joints, the pleura, the pericardium, and the endocardium.

Duval in his study of meningococcus septicemia makes the statement that no authentic cases are on record in which the meningococcus has produced lesions outside the meninges in the absence of preexisting meningitis. However, we now know that the meningococcus may occur in the blood in cases in which there was no evidence whatever of preexisting or accompanying meningitis.

The earliest case of primary meningococcus septicemia to be reported is that of Salomon, which occurred in 1902. This patient

presented the symptom complex of chills, fever, and a profuse eruption resembling erythema exudativum. These symptoms continued for a period of about two months, at the end of which time the patient developed meningitis, the meningococcus being found in the spinal fluid. This patient finally recovered.

Andrewes, in 1906, reported a case of meningococcus septicemia who died in a few days and showed no evidence of meningitis, either during the course of the disease or at autopsy.

Liebermeister, in 1908, reported a case of meningococcus septicemia in which the meningococcus was demonstrated in blood cultures. This patient, after an illness of several months, finally recovered without ever having had any symptoms of meningitis.

Bovaird, in 1909, reported a case of meningococcus septicemia in which the spinal fluid was sterile. This patient's illness was complicated by severe iridocyclitis, but eventually ended in recovery after several injections of antimeningitis serum.

Cecil and Soper, in 1911, reported a case of meningococcus endocarditis and are inclined to favor the hematogenous route of infection in epidemic cerebrospinal meningitis.

Up to 1911 there appear to have been five cases of meningococcus septicemia reported in which there was no evidence of meningitis.

In 1915 Bray reported a case of meningococcus septicemia associated with pulmonary tuberculosis in which the patient recovered following the injection intravenously of antimeningococcus serum. He summarizes his case as follows: "The illness extended over a period of more than five months, with a known septicemia of three months' duration. The 15 blood cultures yielded the meningococcus. The spinal fluid was sterile. The disease was characterized by a septic course, multiform eruption and cardiac murmurs, which later disappeared. The course of the infection was apparently not influenced by the administration of the serum." Bray's case received 260 cubic centimeters of antimeningococcus serum intravenously during a period of 12 days. The initial dose was 20 cubic centimeters and was gradually increased until the maximum of 40 cubic centimeters was reached. He considered that the severity of the symptoms, together with the fact that the blood cultures still remained positive, suggested the advisability of discontinuing this form of treatment.

In 1917 Anderson reported four cases of meningococcus septicemia. These cases were apparently fulminating in type, showed a marked purpuric eruption and all resulted in death within a few days.

Sainton and Bosquet, in 1917, in discussing the clinical varieties of meningococcus septicemia, state that meningococcemia as well as meningitis may occur in such attenuated form that it may be unrecognized. They consider that one of the properties of the meningo-

coccus is its ability to set up ephemereal disturbance in both the joints and the meninges.

In 1918 Sainton in discussing meningococcus infection of the blood describes seven different forms which this infection may assume, namely, the fulminating, the typhoid, the pseudomalarial, the eruptive, the articular, the metastatic and the abortive. He describes one case of meningococcemia in which meningitis developed on the sixty-ninth day. In the pseudomalarial form the patient may come and go freely during the period between attacks and thus sow the germ broadcast. Sainton considers intravenous injection of antimeningococcus serum to be the logical treatment, but recommends that great care be used in giving the serum intravenously, as this procedure occasionally proves fatal.

Netter in discussing intermittent fever of meningococcemia states that meningococcemia may assume the clinical appearance of typical intermittent fever, quartan or tertian. The attacks often coincide in such cases with the appearance of an eruption. In the majority of cases symptoms of cerebrospinal meningitis succeed these febrile attacks, but they may not appear for one or two months or more. Meningitis may even be absent altogether.

Krumbhaar and Cloud report three cases of fatal cerebrospinal meningitis with endocarditis. They emphasize the early occurrence of petechiæ as useful evidence in similar cases of septicemia.

Marino reports a case of meningococcus septicemia which died about nine hours after admittance to the hospital. He showed marked cyanosis and numerous hemorrhagic areas over the chest, the abdomen, and the back, and blood cultures were positive for meningococcus.

Findlay, in 1919, reports a case of meningococcus septicemia without meningitis. The patient on admission presented a picture resembling the polyarticular type of gonorrheal rheumatism. He had a well-marked scarlatiniform rash on the thorax, the back, the face, the legs, and the arms. Blood cultures were negative. Autopsy showed no evidence of meningitis, but smears from the serous exudate of the knee joint and the pericardium showed the presence of the meningococcus.

Baeslack, in a study of 25 patients suffering from meningitis, demonstrated the meningococcus in the blood in 36.3 per cent of these cases. He concludes that systemic infection by the meningococcus is more frequent than previously suspected and that this systemic infection may occur without appreciable or with no localization. Also, he thinks that the systemic infection may be previous to or coexistent with meningeal involvement, and therefore that the intravenous administration of antimeningococcus serum is rational and is indicated in conjunction with the intraspinal treatment.

Herrick believes that epidemic meningitis is preceded by a stage showing symptoms and signs of a generalized infection. This stage he considers lasts from a few hours to three days, averaging about 48 hours. A few patients with this meningococcus sepsis never develop meningitis. He states that these are usually either the abortive or the fulminating cases, rarely those with prolonged courses. He lays much emphasis on the skin manifestations in these cases. The milder types usually show a macular rash resembling early chicken pox or large rose spots. The predominating skin sign is the petechial rash. Purpura is a feature of the fulminating cases.

Renault and Cain in discussing meningococcus septicemia believe that purpura is a manifestation of septicemia and that the diagnosis can be made by cultivating the serous fluid from the purpuric lesion or by histological examination of a scrap of tissue from it.

Sergent reports a case of meningococcus septicemia which recovered after the intravenous injection of a stock vaccine of meningococci.

Lereboullet and Cathala report a case of meningococcus septicemia which at first was regarded as simple rheumatoid purpura, but which a few days later developed fulminating meningitis. They emphasize the necessity of seeking for the meningococcus in every case of primary purpura.

Ribierre in discussing meningococcemia emphasizes the importance of identifying the exact strain of the meningococcus causing the infection in order that specific antiserum may be used. He advises five injections at 24-hour intervals, alternating subcutaneously and intramuscularly. If improvement is not observed he then gives the serum intravenously. He considers that the patient should be kept under observation for at least a month after the supposed cure, as there may be a tardy relapse.

Blackfan in discussing the treatment of epidemic meningitis states that the intravenous administration of serum is indicated theoretically by the occurrence of a primary blood infection before the onset of the meningeal infection. As a rule, however, this occurs early and is a transitory invasion. The diagnosis at this stage of the disease is difficult to make and the vast majority of the cases are not recognized before the development of the meningeal symptoms. He states that after this time there is usually no bacteremia.

The following case of meningococcus septicemia without meningitis or endocarditis is reported:

Case history.—Male, aged 21 years, white, unmarried.

Complaint.—Headache, fever, drowsiness, lassitude, loss of appetite.

Family history.—Negative.

Personal history.—Measles in childhood; influenza in 1918, mild case, good recovery; influenza again in March, 1920, duration three weeks, good recovery, no complications.

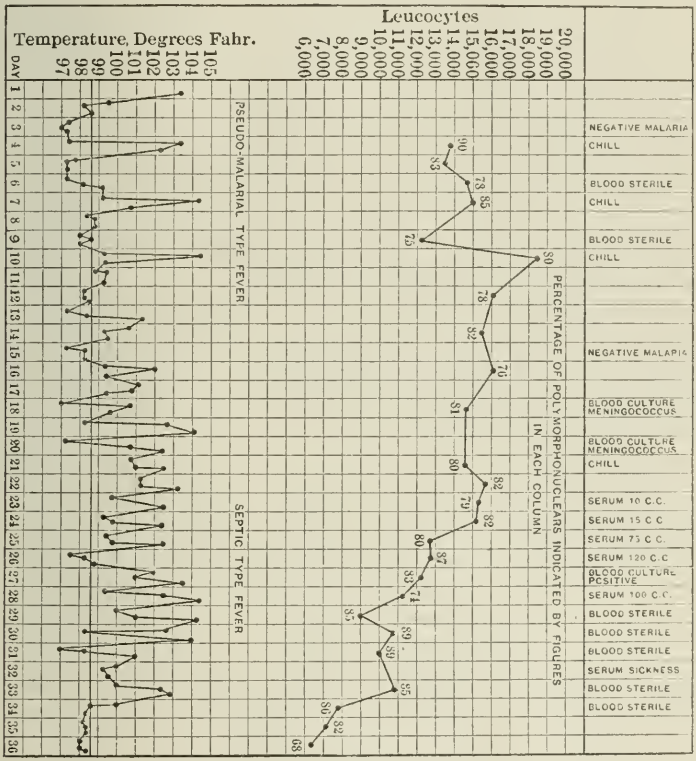
Present illness.—For a week prior to admission the patient felt tired and drowsy; had occasional headaches and poor appetite. Just prior to admission to hospital the patient had a chill and severe headache.

Physical examination.—Upon admission to the hospital: Temperature 103.4°, pulse 104, respirations 24. The patient was well nourished and muscular. Color of skin and mucous membranes was good; no petechiæ. Lymphatic glands were not enlarged, spleen not palpable. Pupils were equal and reacted to light and accommodation; tongue slightly coated; tonsils somewhat hypertrophied but no angina present. Teeth in good condition; heart negative; lungs showed a few scattered râles at both bases. Abdomen soft; no tender areas or tumors; bones and extremities negative; reflexes, both superficial and deep, were normal. Eye grounds negative; no muscular rigidity; no Kernig signs; no evidence of meningeal irritation.

Laboratory data.—Roentgen ray of chest negative; sputum negative for tubercle bacilli; throat cultures were repeatedly negative for Klebs-Loeffler bacilli and for meningococci. Blood smears were constantly negative for malarial parasites; blood cultures during the first two weeks of the disease were negative. The Noguchi reaction was negative. Stools normal and negative for ova or parasites. A complete record of the blood examination is shown in the chart.

Clinical course.—On the day following admission the patient's temperature was normal and remained normal until the third day, when he had a chill and his temperature rose to 103.4°, followed by a profuse sweat and a return to normal temperature. Seventy-two hours later the patient had a similar chill, the temperature rising to 104.2°, returning to normal the next day. This quartan type of temperature continued during the first two weeks, following which the temperature assumed the septic type with a tendency to approach normal in the mornings and with an evening rise to 102° or 103°. The type of temperature in this case is shown in the chart. The leukocyte count during the first two weeks varied from twelve to eighteen thousand, with approximately 80 per cent of polymorphonuclears. Following the second chill on the fourth day after admission several spots appeared on the skin which were slightly raised, hyperemic, pale rose in color and irregularly distributed over the upper chest, the legs and the arms unaccompanied by itching, and which tended to disappear during the apyretic periods. This eruption resembled very much the rose spots of typhoid fever.

The eruption would sometimes persist for a day or two, then disappear completely and reappear again at irregular intervals. It was noticed first on the fourth day and persisted up to the third week. On the tenth day there was some swelling and tenderness of the right knee, which disappeared in 24 hours. On the twelfth day the patient complained of soreness of the fingers and the left wrist, which persisted for one day. On the days the temperature remained normal, the patient was much improved, had no discomfort, appetite was good and there was a general feeling of well-being. During the second week the patient developed marked herpes labialis.



There were no localizing signs or symptoms during the course of the disease, except the ephemeral joint disturbances, no evidence of meningeal irritation, and repeated blood cultures were negative up to the eighteenth day of the disease, when a Gram-negative diplococcus was discovered. The temperature chart, which strongly suggested a quartan malarial infection, led to repeated search for malarial parasites, although the blood picture, showing a moderate leucocytosis and an increase in the polymorphonuclear cells, was distinctly against a malarial infection. However, on the ninth day quinine was administered by the mouth in 10-grain doses, three times

a day for a period of five days, without noticeable effect. On the eighteenth, twentieth and twenty-first days blood cultures showed the presence of a Gram-negative diplococcus which conformed in all respects to the meningococcus, both culturally and serologically. This organism was agglutinated by polyvalent antimeningococcus serum and by Type IV Gordon serum. It was also identified as a meningococcus by the Naval Medical School and the Public Health laboratories at Washington, D. C.

On the twenty-third day serum treatment was commenced, ½ cubic centimeter of polyvalent antimeningitis serum being given subcutaneously, and two hours following this 7 cubic centimeters were given intravenously. At this point the patient became slightly cyanotic, the pulse became rapid and small and there was evident dyspnea. The intravenous injection was stopped at this time.

On the twenty-fourth day 15 cubic centimeters of polyvalent serum was given intravenously without any untoward effect.

On the twenty-fifth day a total of 75 cubic centimeters of serum were given intravenously in doses of 15 cubic centimeters each, at intervals of from one to two hours, depending on the patient's condition. These injections were well tolerated.

On the twenty-sixth day a total of 120 cubic centimeters of serum were given intravenously at intervals of one hour or two. These injections produced no alarming symptoms. The serum given up to this time agglutinated the meningococci isolated from the patient's blood in dilutions of 1 to 50.

On the following day blood cultures still showed the presence of the meningococcus and an effort was made to secure serum possessing higher agglutination qualities. A serum was finally obtained which agglutinated this particular strain of meningococcus in a dilution of 1 to 400. On the twenty-eighth day 100 cubic centimeters of this serum was given intravenously by the gravity method after diluting three times with a normal saline solution. An hour and a half was allowed to complete this injection. The patient showed no alarming symptoms immediately following this injection, but 18 hours later became markedly cyanotic, developed a purpuric rash, the pulse became rapid and feeble, the temperature subnormal, the heart dilated, and the condition distinctly alarming. Following the use of atropin and digitalin hypodermically these alarming symptoms gradually subsided, the temperature rose to 101° and the patient about six hours later was in good condition.

On the thirtieth day the temperature was 103°, the pulse 112 and the respirations 24, and it was not considered advisable to continue the further use of serum at this time, particularly as blood cultures following the last injection of serum were negative.

On the thirty-first day the temperature remained normal, the pulse 92 and the respirations 20. The leukocyte count was normal at this time and the blood culture was negative. From this point on the patient made constant gains and repeated blood cultures were negative.

On the thirty-second day the patient developed serum sickness, nine days following the first administration of the serum. He showed the typical urticarial lesions of serum sickness, which persisted for about twenty-four hours and then disappeared. From this point on the patient made a rapid and uneventful recovery and two months later showed no evidence of his former illness.

There was no evidence of an endocarditis at any time during the course of the disease, and with the exception of the evanescent arthritis of the knee and wrist there was nothing to indicate a localizing lesion. At no time during his illness did the patient show evidence of meningitis or meningeal irritation. A spinal puncture was not performed for two reasons: the first being the absence of all signs pointing to meningitis, and the second the danger of introducing the meningococcus into the spinal canal while the patient showed the presence of the organism in the blood stream. Although it has been urged by some observers that a prophylactic injection of antimeningitis serum into the spinal canal might prevent the development of meningitis, it was considered that the intravenous method of administration, while more directly combating the septicemia, would at the same time act as a prophylactic against meningeal infection.

During the acute course of the disease the patient showed evidence of renal irritation, as evidenced by the presence of albumin and occasional hyalin and granular casts in the urine. These, however, disappeared following the return of the temperature to normal, and the urine one month later was negative.

As to the best method of administering serum in meningococcus septicemia it would appear that the frequent intravenous injection of small amounts of serum, say 15 cubic centimeter to a dose and repeated at intervals of an hour or two, depending on the patient's condition, are preferable to the single injection of a large amount of serum, as the alarming symptoms following the injection by the intravenous methods may frequently be delayed, whereas if the injection be given in small doses, waiting a few hours between each injection, the chances of overwhelming the patient before the serum injections can be stopped are greatly lessened.

It is believed that this principle would apply with equal force in the administration of other specific sera and that many of the untoward effects could be avoided by this procedure.

This case may be summarized as follows:

It began as an acute febrile condition with a temperature chart typical of quartan malaria but with a moderate leukocytosis and an increase in the percentage of polymorphonuclears, and at the end of the second week the temperature became distinctly septic in type. A maculopapular eruption, resembling the rose spots of typhoid fever, appeared on the fourth day and persisted up to the third week. There were no localizing signs at any time during the course of the disease except the transient joint symptoms. Blood cultures were negative up to the eighteenth day when the meningococcus was identified. He received a total of 320 cubic centimeters of anti-meningococcus serum intravenously over a period of six days, following which the temperature became normal and the blood cultures sterile. Recovery was uneventful from this point. The prompt termination of the febrile course, the marked improvement in the general condition of the patient and the negative blood cultures following the specific serum therapy leave no room for doubt regarding the efficacy of this form of treatment.

It would appear that cases of meningococcus septicemia are becoming more frequent, or at least more frequently recognized, and that it is well to be on the alert for such cases in order that the diagnosis may be made and treatment instituted before the development of meningitis or endocarditis. The appearance in an acute febrile case of petechiæ or a maculopapular eruption resembling at times the rose spots of typhoid fever, together with a moderate leukocytosis and a temperature chart, which may either be of the septic type or may resemble markedly the chart of malarial fever, should raise the suspicion of meningococcus sepsis and should lead to repeated blood cultures being made in an effort to identify the meningococcus. The skin lesions of meningococcus sepsis are particularly striking. The eruption may be purpuric, hemorrhagic or maculopapular. In the acute fulminating cases, which usually die within the first few days, a purpuric generalized eruption is the rule. These cases are quickly overwhelmed and die frequently before the development of meningitic symptoms. In the protracted cases of meningococcus sepsis the character of eruption shows more of a tendency to assume the maculopapular or hyperemic type.

Some observers lay great stress on the intravenous administration of serum in acute meningitis and are of the opinion that the organism gains entrance to the meninges through the blood stream, thereby inferring that all cases of meningitis are primarily bacteremias. While it is true that positive blood cultures can be obtained in a fairly large percentage of cases of meningitis the fact also remains that the average case of cerebrospinal meningitis has well-developed

eningitic symptoms at the time he comes under the observation f the physician. Acute primary meningococcus sepsis without in-olvement of the meninges is still a rare condition, and while these ases, if untreated, as a rule, will develop a meningitis in the course f a few weeks or months, their early recognition by means of blood ultures will usually serve to prevent the development of meningitis y the early administration of adequate serum therapy.

BIBLIOGRAPHY.

1. Baeslack, F. W., Bunce, A. H. (and others): Cultivation of Meningococcus tracellularis (Weichselbaum) from the Blood, Jour. Am. Med. Assn., Chicago, 18, lxx, 684–686.

2. Weichselbaum, A.: Ueber die Aetiologie der akuten Meningitis Cerebro-inalis, Fortschr. d. Med., Berlin, 1887, v, 620–626.

3. Gwyn, N. B.: A Case of General Infection by the Diplococcus Intracellu-ris of Weichselbaum, Philadelphia Med. Jour., 1898, ii, 1255.

4. Cochez, A., and Lemaire: Relation de l'épidémie de méningite cérébro-inale a Alger et dans les environs, Arch. gén. de méd., Paris, 1902, vii, 574–9.

5. Jakobitz: Ueber zwei Fälle von epidemischer Genickstarre, München. med. chnschr., 1905, lii, 2178.

6. Martini and Rohde: Ein Fall von Meningokokken-Septikamie, Berl. klin. chnschr., 1905, xlii, 997–999.

7. Lenhartz, H.: Deutsch. Arch. f. klin. Med., Leipzig, 1905, lxxxiv, 81–98.

8. Marcovitch, A.: Meningokokken im kreisenden Blute, Wien. klin. chnschr., Vienna, 1906, xix, 1312.

9. Robinson, G. C.: Bacteriological Findings in Fifteen Cases of Epidemic erebrospinal Meningitis, Am. Jour. Med. Sci., Philadelphia, 1906, xxxi, 603.

10. Duval, C. W.: Septicemia Caused by the Meningococcus, Jour. Med. esearch, Boston, 1908, xiv, 259.

11. Elser, W. J.: A Contribution to the Study of Epidemic Cerebrospinal eningitis, Jour. Med. Research, Boston, 1905, xiv, 89–107.

12. Salomon, H.: Ueber meningokokkenseptikämie, Berl. klin. Wchnschr., 02, xxxix, 1045.

13. Andrewes, F. W.: A Case of Acute Meningococcal Septicemia, Lancet, ndon, 1906, lxxiv, 1172.

14. Liebermeister, G.: Ueber meningokokkensepis, München. med. Wchnschr., unich, 1908, lv, 1978.

15. Bovaird, D.: Meningococcus Septicemias with Sterile Cerebrospinal luid, Arch. Int. Med., 1909, iii, 267.

16. Cecil, R. L., and Soper, W. B.: Meningococcus Endocarditis with Sep-cemia, Arch. Int. Med., 1911, viii, 1.

17. Bray, H. A.: Chronic Meningococcus Septicemia Associated with Pul-onary Tuberculosis, Arch. Int. Med., September, 1915, xvi.

18. Anderson, W., McNee, J. W. (and others): Cases of Meningococcus epticemia, Jour. Royal Army Med. Corps, London, 1917, xxix, 463.

19. Sainton, P., and Bosquet, J.: Clin. Med., London, 1917, ciii, p. 7.

20. Sainton, P.: Les méningococcémies, Paris méd., Paris, August 3, 1918, xix, 86.

21. Netter, A.: Bull. et mém. Soc. med, des hôp. de Paris, 1917, 3. s., xli, 018–1023.

22. Krumbhaar, E. B., and Cloud, J. H.: Acute Meningococcic Endorcarditis and Septicemia, Jour. Am. Med. Assn., 1918, lxxi, 2144.

23. Marino, F.: Meningitis in the Army, Am. Jour. Med. Sci., Philadelphia August, 1918.

24. Findlay, G. M.: Note on a Case of Meningococcal Infection without Meningitis, Jour. Royal Naval Med. Service, 1919, v, 198.

25. Herrick, W. W.: The Intravenous Serum Treatment of Epidemic Cerebrospinal Meningitis, Arch. Int. Med., April, 1918, pp. 21–54.

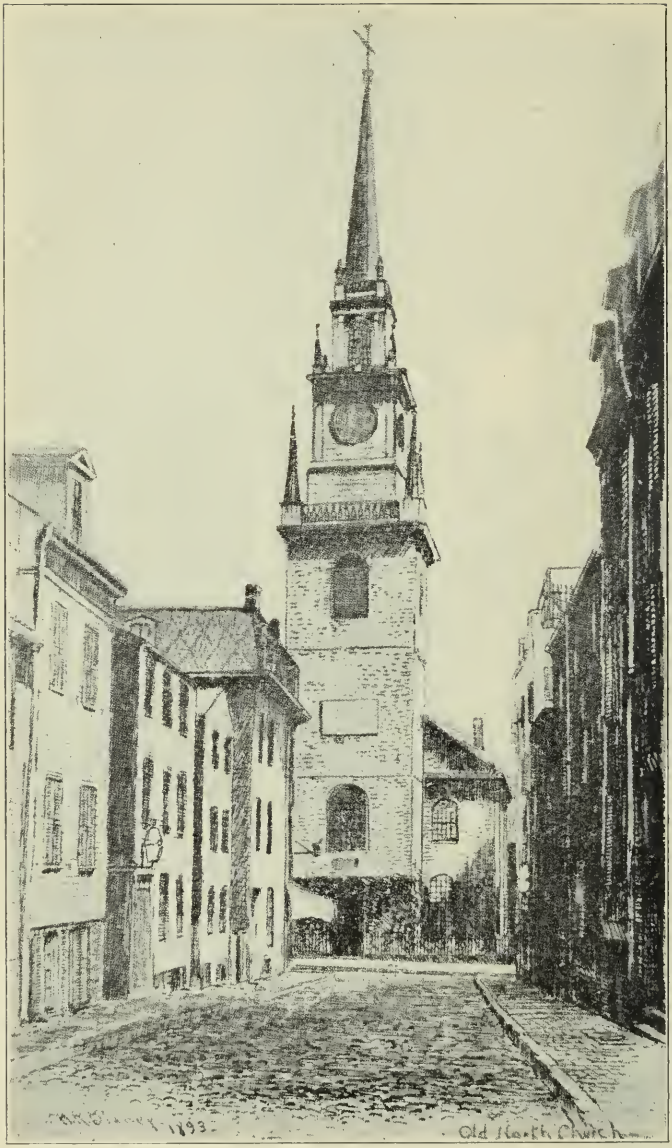
26. Renault, J., and Cain, A.: Meningococcus Septicemia, Ann. de méd., Paris, 1920, vii, 114.

27. Sergeant, E. (and others): Bull. de la Soc. méd. des hôp. de Paris, March 26, 1920, No. 12, xliv, 428.

28. Lereboullet and Cathala, J.: Meningococcus Purpura, Paris méd., Paris 1920, x, 305.

29. Ribierre, P., Hébert, P., and Block, M.: Meningococcemia, Ann. de méd. Paris, December, 1919, vi, 341.

30. Blackfan, K. D.: The Use of Antimeningococcus Serum in the Treatment of Epidemic Meningitis, Jour. Am. Med. Assn., 1921, lxxvi, 36.



THE OLD NORTH CHURCH, BOSTON.

HISTORICAL.

ETER ST. MEDARD, SURGEON IN THE NAVY OF THE UNITED STATES, 1756–1822.

By W. M. Kerr, Lieutenant Commander, Medical Corps, United States Navy.

When a man in the ordinary walks of life, has been dead for a undred years it is seldom that anything is remembered of him but is name and his occupation, and often these are hidden away in usty archives. The qualities which endeared him to his family and his friends, or which made him to be despised by his neighbors, is physical characteristics, and the happenings of his humdrum life, erhaps even his very existence, are unknown to the people who now ve on the spot where he dwelt.

It is so with Peter St. Medard, at one time one of the senior officers f the Medical Corps of the United States Navy. He was born in rance in 1756. Just when he came to the American Colonies is ot recorded in any known document, and we do not know where how he received his medical training. In the days of his youth, the edical education of a doctor in the colonies was such as he could ick up while serving an apprenticeship to some successful practi-oner in one of the larger towns, when he combined the duties of student with many of the menial offices of a servant. He ground ie powders, made the pills, ointments, and plasters, rode with his receptor on his rounds, held the basin when the patient was bled, elped to adjust plasters, to sew up wounds, and ran to patients' ouses with vials of medicine. In the moments snatched from duties ich as these he swept out the office, cleaned the bottles and jars, and nded the night bell. All these duties, undoubtedly, young Peter t. Medard performed.

His medical knowledge was derived from personal experience ather than from books, and the amount so obtained naturally bore direct relation to the sharpness of his powers of observation and the rength of his memory, but we are not informed concerning these ialities. When his apprenticeship was ended Dr. St. Medard se-cted a suitable location in Boston and assumed the practice of medi-ne. As the years went by we suppose he grew in popularity and ealth according to his ability. But we know little of his ability. Ve do know, however, that in August, 1779, he was appointed a sur-eon in the sea forces which were then worrying the ships of King

George, and that he was married to Susannah Farrington, in Boston on May 12, 1781, and that of this union three daughters were born.

Peter St. Medard was 23 years of age when he went to sea as a surgeon, but no record has been found of the vessels upon which he served. It is probable that he went to sea on one of the numerous privately owned ships which were in commission at that time, for his name does not appear as an officer of the United States Navy until July, 1799, when he was appointed a surgeon in the Regular Establishment.

To a young medical man at the time of the Revolution, service as a surgeon on board a privateer was not unattractive, as a considerable portion of the money realized from the sale of captured British vessels and their cargoes was divided among the officers and crew as an incentive to securing more captures. In fact, it was this division of the spoils rather than the wages that induced many of our best seamen and others of an adventurous disposition to enter this peculiarly dangerous service. It frequently happened that even the common sailor received as his share on one cruise, over and above his wages, $1,000—a small fortune in those days for a mariner.

Edgar S. Maclay, in his History of American Privateers, says:

"This opportunity to get rich suddenly attracted a number of men who later became officers in the Regular Navy and owed their success on Government ships to their early training on the privateers.

"In our struggle for independence American privateers were a most important, if not predominating, feature of our sea power. These vessels brought the war to England's shores and destroyed commerce in British harbors, threw the coast cities of England into continual alarm, caused a great rise in the price of commodities throughout the country, and captured over 800 British vessels.

"Great Britain was unable to stop them from going in and out of British waters or to prevent them from picking up British homeward-bound merchant ships in the English or Irish Channels and sending their prizes into French and Spanish ports to the great terror and annoyance of British merchants and shipowners.

"When the American colonists finally realized that they must resort to open hostilities in order to maintain their rights, they became extremely active in fitting out vessels at private expense. Every seaport soon had its quota of privateers scouring the seas or hovering on the coast of the enemy. In the first two years of the war Massachusetts had in commission 53 such vessels.

"Between 1776 and 1782 there was rapid increase in the size and efficiency of the craft engaged in privateering. In the early part of the war any vessel, old or new, that could possibly be converted

nto a war craft was eagerly seized, a few guns mounted on her and she went to sea with, in some cases, the most curious assemblage of men imaginable. Physicians, lawyers, Army officers, politicians, merchants, and even ministers of the gospel were found in their complements, all seemingly carried away by the craze for privateering.

"As the war progressed and as the profits from prizes enriched the owners of these crafts, new, swifter, and better vessels were built expressly for this service, so that although on the outbreak of hostilities 10 guns were considered a large armament for a privateer and 30 to 60 men were deemed sufficient to man each ship, toward the latter part of the war vessels mounting 20 and even 26 guns and having complements of 150 to 200 men were the rule rather than the exception.

"The last three years of the war for American independence were marked by an almost complete suspension of maritime activity on the part of Continental warships, and a remarkable increase in the number and activity of our privateers. Many of these ships, such as the frigates *Providence*, *Queen of France*, and the *Boston* and the sloop *Ranger* of Capt. John Paul Jones fame, had been captured or destroyed. In fact only six war crafts were left to the United States: The 32-gun frigate *Alliance*, the 32-gun frigate *Confederacy*, the 32-gun frigate *Deane*, the 28-gun frigate *Trumbull*, the 32-gun ship *Duc de Lauzun*, and the 18-gun ship *Saratoga;* and during this period three of these vessels were captured or lost. Therefore, had it not been for our privateers the Stars and Stripes would have been, for all practical purposes, completely swept from the seas.

"In the year 1780, 228 American privateers were commissioned, carrying in all 3,420 guns; in 1781, 449 were commissioned with 5,735 guns; and in 1782, 328, with 4,845 guns.

"The details of many of the cruises of these ships and the actions fought have not been recorded. Battles were fought, daring raids on the enemy's coasts were undertaken, and many heroic incidents occurred; but as these vessels sailed merely in a private capacity most of their logs were lost a few years after they returned to port, and what data have been preserved are, as a rule, meager and fragmentary."

Hence we know nothing of the service of Dr. Peter St. Medard, or even the names of the privateers in which he must have sailed. His correspondence hints at ardous service during the Revolution and in the Tripolitan War. In fact, he appears to have returned to his home in Boston worn and weary of war, for on the 23d of March, 1805, he addressed the following letter and petition to the Secretary

of the Navy, together with two certificates of ill health signed by two physicians of Boston:

Boston *23 March 1805.*

Sir: I have the honor of acknowledging you the receipt of your favours of the 6 & 13 instant. I have likewise the Honor of inclosing you Documents in support of my inability for any further Sea Service: together with my Humble petition, which I have no doubt will evince you of the Justice of my claim towards the Government and Likewise the Justice you will be pleased to render me in such case.

While I have the Honor of remaining with the Highest Respect and esteem, Sir,

Your very Humble Servt.

P. st. Medard.

The Honorable Robert Smith, Esqr.
Secretary of the Navy, Washington.

To the Honorable the Secretary of the Navy of the United States.

Humbly sheweth Peter St. Medard Surgeon in the Navy of the United States, that he has had the honor of being in Service during the course of the last American war, and also, in the present contest with the Barbary powers, your petitioner flatters himself, that he has served his country, with faithfulness, zeal & satisfaction, That at present the natural infirmities of advanced Life, are approaching your petitioner; such as dimness of sight, Sciatic pains, weakness of Limbs; and the usual effects of a broken down Constitution, worn down, by the fatigues of a Sea Life; more over, ruptured while in the Service in the revolutionary war, under which accident your petitioner has for many years laboured & has so far debilitated his constitution, that it is now very troublesom in your petitioner's advanced Life: wherefore your petitioner has the honor of laying before you, Certificates in support of his case; and humbly prays, that it may please the Secretary of the Navy, to accept & receive the resignation of your petitioner's—commission, of surgeon in the Navy of the United States; and while your petitioner declines the Sea Service of his Country, from real inability to support its fatigues he humbly prays for an adequate establishment, either at the Marine, or Navy Hospitals, or Yards; and to the Superintendence of one, or the other of those departments, he thinks himself regularly entitled, in preference to those, who have never borne the Commission of the United States, nor who have never sacrificed their Health to the said Service, either in the Revolutionary or previous war:—to provide for Surgeons in Hospitals on shore (when infirmed or advanced in Life in the Service of their Country) allowing they are qualified for and worthy of such trust; your petitioner relying on your Justice & that of the Government; & in duty bound shall ever pray for your and its welfare.

P. St. Medard.

Boston *23rd March 1805.*

Boston *March 23rd 1805.*

This Certifies that I have known Doctor Peter St. Medard and witnessed his excrutiating pains in the course of the last winter in consequence of a Sciatica induced by a long seafaring and advanced life, likewise an Inguinal Rupture, which in this state of life has become very troublesome and has so far enfeebled his Constitution as to render another voyage really dangerous.

Jon[a] Sprague,
pratising Phisician.

Boston *23rd March 1805.*

This certifies that Doctor Peter St. Medard is afflicted with an inguinal upture, under which it appears he has for many years laboured; and which has far debilitated his constitution as to render it dangerous for him to expose imself to the hardships of very active professional exertion.

John Warren.

'o whom it may concern.

The signer of this certificate, John Warren (1753–1815), of Roxury, Mass., rendered distinguished Army service in the Revolution nd was one of the founders and the first professor of anatomy and urgery of the Harvard Medical School (1783). He was the first resident of the Massachusetts Medical Society, an office which he eld until his death (1804–1815). He amputated at the shoulder oint in 1781 and excised the parotid gland in 1804. His son, John 'ollins Warren (1778–1856), of Boston, was a pupil of Astley Cooper nd Dupuytren, and succeeded to his father's professorship in 1815. Ie was a pioneer in the excision of bones and joints, such as the hyoid 1804) and the elbow (1834), introduced the operation of staphyorrhaphy for fissure of the soft palate in 1828, and was the first urgeon in this country to operate for strangulated hernia. He was ie founder of the Massachusetts General Hospital (1811), and of ie Warren Museum, and he practically introduced ether anesthesia n surgery (1847). He is mentioned in this paper because of the bove certificate and because he attended Susannah Farrington St. Iedard during her last illness and was a witness to the signing of er will on the day before her death, April 6, 1822.

The Secretary of the Navy did not accept Dr. St. Medard's resignaon of his commission as a surgeon of the Navy, for he held this ommission to the day of his death.

It was customary in the early days of our service to employ an fficer only when his services were actually needed, so it is probable iat between tours of active service Dr. St Medard practiced his proession in Boston. In 1805 he lived in a 10-room wooden house in ack Street, a thoroughfare which ran from Hanover Street north Prince Street, in a locality still known as the "North End" of oston.

At that time the houses were not numbered, but in Frost's Boston irectory for 1821 Dr. St. Medard's residence is given as No. 11½. he street was a crooked thoroughfare lined with small, white, ooden houses, many of which were surrounded by gardens. It urved gently up a hill near the top of which the spire of Christ's hurch towered above the surrounding roofs. Christ's Church, or, s it is often called, the Old North Church, claims the honor of aving displayed the lanterns which served as a signal to Paul evere on the occasion of his famous "midnight ride." Dr. St.

Medard attended this church, and in 1808, in company with a friend, George Clark, he purchased a tomb in the church building.

The doctor's house was comfortably furnished, as an inventory on file in the office of the Register of Probate and Insolvency of Suffolk County, Mass., reveals.

The "study," in which he received his patients, contained a green-topped desk, a bookcase with books which were valued at $50, a fireplace, a chest of decanters, sundry mahogany chairs, a mortar and pestle, a case of surgical instruments, an assortment of medicines, and a belt and dirk. It is regrettable that the person who took the inventory of Dr. St. Medard's library failed to mention the titles of his books. Such a list might have thrown some light upon his literary tastes and professional qualifications.

In 1824 Back Street was included in Salem Street, which to-day winds among dingy tenements that have replaced the wooden houses and gardens familiar to Peter St. Medard. No. 11½ Back Street was located on a bend of the thoroughfare not far from Hanover Street. Dr. St. Medard's residence has long since disappeared and on the spot where it stood is a brick building now occupied by a dealer in tailors' trimmings.

Another letter written by Dr. St. Medard has been preserved in the Navy Department Library. It was written in Boston, February 3, 1815, and is addressed to Benjamin Crowninshield, Esq., Secretary of the Navy, Washington. It is as follows with all its queer phraseology, spelling, and punctuation:

Boston, *February 3, 1815.*

Sir: Your appointment at the head of the Navy Department imposes on me the duty of reporting myself to you as one of the Surgeons attached to that Department.

I proposed to myself the honor of paying you my respects (personally) before your leaving this town for the head of the Department, but the uncertainty of the public and private reports about your accepting or not accepting that appointment has deprived me of that honor, and, I was not correctly informed of the former, not until the morning of your leaving town; I shall in this beg your indulgence, and observe to you that, as an old servant to the government, to recall to your mind a series of services, which I presume are recorded in the office, and have no doubt but that, in your impartial judgment will think it nothing but just and equitable that they should be rewarded with some honorable and permanent appointment and placed in a station on shore particularly adapted to reward the services of one who has spent his whole life and sacrificed his health and comfort in wars in the service of the Navy of the United States:—it is true that on the 22nd of April, 1812, Commodore William Bainbridge, (appraising merit) was pleased to order me on recruiting service in this town, the original order has been transmitted to the Navy office and afterwards sent back to me as being approved by the government; in the said order the Commander expressed his opinion in my favor. Conscious as I am that I never disgraced the commission that I was honored with in the

revolutionary war, dated August 1779, nor the one that I have now the honor of being invested with from July 1799 to this day. My zealous services during and since the revolution are sufficiently known to the government, as they were rendered in a professional line, they would not have been continued so long had I been defficient in zeal, skill and capacity.

Forgive me then if with the outmost anxiety, I pray you to give me a place on the list of those candidates to whom you destine some appointments on shore and where ever you may judge I may be most useful (having a family to support), I have the Honor to remain with High respect and consideration.

Sir, Your very Humble Servant,

P. St. Medard,
Surgeon, U. S. Navy.

Benjamin Crowninshield, Esq.,
Secretary of the Navy, Washington.

Dr. St. Medard was 59 years of age when he wrote this letter. In the Navy Register for that year he is mentioned as being stationed at Boston, probably on recruiting duty, and he remained there until his death.

In the spring of 1822, Dr. Medard became ill, and on Wednesday, the 27th of March, it was evident that his remaining days on earth were few in number, so in the presence of a few friends, his last will and testament was drawn up and the old doctor being too weak to write, put his mark upon it. It was written as follows:

In the name of God, Amen.

I, Peter St. Medard—of Boston in the county of Suffolk and State of Massachusetts, Surgeon, considering the uncertainty of this mortal life, and being of sound and perfect mind and memory, blessed be Almighty God for the same, do make and publish this my last will and testament, in manner and form following: Being infirm of Body, But of Sound Disposing Mind and Memory and mindful of my own frailty and mortality. Do make, Publish and Declare this my last will, and Testament, in manner and form following, That is to say, In the first place and principally I commend my soul to the mercy of God who gave it hoping for a Resurrection to Eternal life. In the Second place I commit my body into the hands of my Relations and Friends to be disposed of according to their Discretion and as to my worldly Estate, I give and Bequeath all and every Part and Parcel of the same to my Beloved Wife, Sussannah St. Medard whether the same be real, personal, or mixt, in Possession or reversion, or in debts, monies or effects.

And I do hereby appoint John Andrews and my Beloved Wife Sole Executors of this my last will and testament; hereby revoking all former wills by me made. In witness whereof, I have hereunto set my hand and seal, the Twenty-seventh day of March in the year of our Lord, one thousand eight hundred and twenty-two.

Peter (his x mark) St. Medard.

Signed, sealed, published and declared by the above named Testator to be his last will and testament in the presence of us, who have hereunto subscribed our names as witnesses, in the presence of the Testator.

Russell Glover,
John Andrews,
Stephen Glover.

His estate at this time, including money, personal property, and his house and land in Back Street was valued at $7,466—a neat sum in those days.

The following day he died.

Two Boston papers, the Independent Chronicle and Boston Patriot, and the Columbian Centinal in their issue for Saturday, March 30, 1822, printed the following obituary notice:

"On Thursday morning, after a short illness, Dr. Peter St. Medard, aged 66, one of the Senior Surgeons of the Navy. The friends and relations of the deceased are requested to attend his funeral this afternoon, from his late dwelling house in Back Street at 2 o'clock.

"The Officers of the Navy and Army, now in this city and its vicinity, and the Members of the Mass. Med. Soc. (of which he was a member) are respectfully invited to attend at the above mentioned time and place, to pay the last honors to the deceased."

So on the afternoon of that day his friends and relatives gathered at the house in Back Street, and they accompanied the remains of the old surgeon up the sloping road to the Old North Church, where they placed them in the tomb which he and George Clark had purchased 14 years before. And if you are curious you can go to-day to that church and for a small fee induce the caretaker to conduct you to a cobweb-covered basement where, by the light of a flickering candle, you may read the following inscription cut in a slate slab which seals a tomb:

No. 26.
Peter St. Medard
and
George Clark's
Tomb. 1808.

THE STUDY OF MEDICINE IN STRASSBURG.

By J. S. Taylor, Captain, Medical Corps, United States Navy.

Now that Strassburg is once again a French city and because the leading facts about its medical school are fairly representative of other ancient institutions, the following notes, abridged from a lengthy account which appeared in La Presse Médicale of October 1, 1921, should be of interest to the medical reader. The occasion for the original historical retrospect was the meeting of the French Congress of Medicine, which took place October 3 to 5, 1921.

From the Middle Ages down to the present day, Strassburg has exerted a strong and beneficial influence on the study of medicine, and has been a center of intellectual development along many lines. Printing was begun there in 1440 and early in the sixteenth century medical works were issued from the presses of Strassburg. The

school dates from 1538, and in 1566, by authority of Maximilian II, it acquired the right to confer the bachelor's degree. From the start it enjoyed great popularity. There were in attendance in 1578, 3 princes, 24 counts, and 200 gentlemen. The faculty consisted of two professors for each school—divinity, law, medicine, and the arts. There was a rector, and the business manager was the city magistrate. In 1621, Ferdinand II raised the school to the dignity of a university, and the medical instruction afforded was of a high order. The year 1652 marked the crèation of a chair of anatomy and botany. When Strassburg passed to France in 1681, the prosperity of the university increased by rapid bounds.

In 1733 a demonstrator of anatomy was appointed and four years later was founded the school of obstetrics. Clinical instruction at the bedside dates from 1738, Leyden and Vienna being the only other schools where this method was employed at the time.

Between 1785 and 1787, the medical school of Strassburg numbered 16 French students, 23 English, 17 Germans and Austrians, 3 Italians, 11 Danes and Swedes, 5 Poles, and 44 Russians.

A word regarding the organization and customs of the medical school is in place here. The professors were appointed for life; the dean held office for 6 to 12 months. Professors were required to take an oath of allegiance to the school and the church and to present one book to the library for the use of the students. The licensed substitutes for the regular professors, to the number of three to six, were selected from the professors of philosophy, the doctors of medicine, or the city physicians. The students were required to take the same pledges of loyalty as their teachers and were strictly under the jurisdiction of the university in relation to all offences other than crimes. They had their own halls for meeting, their own fencing and riding schools.

Preliminary to graduation an examination and a thesis were required. The doctors' degree was given only after a private examination at the house of each professor and a public examination when the candidate was questioned for an hour by each of the three professors. Two questions were then propounded to him, one practical, one theoretical. The test ended with the candidate's presentation of a printed thesis which he read aloud before a solemn conclave of professors, city physicians, and other notables, all of whom were privileged to discuss the theme. These tests satisfactorily passed, there was a solemn procession from the candidate's house lead by a band and children carrying candles to the Hall of the Mirror, where the candidate took the required oath, received the blessing of his sponsor, and the kiss which sealed his membership in the brotherhood of doctors. The procession then reformed and conducted the

new doctor to his home. On the following day he was expected to entertain professors and friends at a banquet paid for out of his own pocket.

For 200 years Strassburg was especially noted for its teaching of anatomy, the city authorities having, in 1566, assigned for dissection the bodies of all executed criminals. John Winther, the two Meckels, and Goethe were among the students of the anatomical school. Surgery was also taught from the start, but Strassburg is chiefly famous for having been the first place to issue treatises on obstetrics and to systematize the study of that subject. The botanical garden of Strassburg, started in 1619, antedates that of Paris.

At the time of the French Revolution the school was suppressed, but soon revived, owing to the need of facilities for training medical men to serve with the armies of the Republic. Schools for this purpose were opened at the same time in Paris and Montpellier.

The reorganized Strassburg Medical School occupied at first the premises behind the cathedral assigned by Cardinal de Rohan to the parochial school. Later, it removed to the palace of the provost of the city, and then to the foundling asylum. Eventually a concentration was effected and buildings were constructed so that the lecture halls, anatomical theater, and hospital might be conveniently located with reference to each other.

By special legislative acts the Strassburg school became, about 1835, the seat of courses designed particularly for medical men proposing to enter the military services.

EDITORIAL.

ON THE ACQUISITION OF USELESS KNOWLEDGE.

In speaking on the topic "The Acquition of Useless Knowledge" before the Medical Six-o'Clock Club at the University of Minnesota one day last year, Dr. Louis B. Wilson, as we learn from the Minnesota Medicine for August, 1921, said: "Useless knowledge to be thoroughly enjoyed must be frankly and unmistakably useless as one acquires it." But, we ask ourselves, what is the value to a man of anything useless? These seem to be days of high tension and efficiency when only useful knowledge counts. I once heard a busy young surgeon, whose day was filled with professional activities, say rather disparagingly, when discussing an elderly practitioner of our acquaintance, "Why that man possesses more useless information that any man I ever knew!" But he did not realize that this "useless information" was the old man's salvation, that its possession enabled him to while away the afternoon of life comfortably by his fireside.

In his talk Dr. Wilson elucidated what the old physician had come to realize early in his professional career. "The old Greek philosopher's dictum that the individual should spend one-third of his life in training, one-third in his personal enjoyment, and one-third in the service of the State is perhaps not applicable to modern conditions. Certainly the order in which he placed the thirds is not the order of to-day. The medical student spends the first third of his life in learning, and a little more than the second third in the service of humanity. The weak point in our present time apportionment lies in the fact that after two-thirds are gone, there still remains another third at the end of life for which frequently no preparation has been made. Thus, the man who knows only the science and art of his own profession and ostensibly entirely abandons interest in both when he retires from practice is a sadly misplaced unit in the community. His service to the State is over but he yet lives. Without internal resources of his own and without the means of becoming in harmony with his environment other than by way of his useful but, withal, narrow life service he is psychologically distraught. He is apt to commit agriculture, California, or suicide. Sometimes even at this late date he attempts to interest himself in the acquisition of useless knowledge, but it is usually

difficult to become interested in postage stamp collections after one is 60, unless the germ was planted at a more impressionable period. Indeed, the retired professional man who has no hobby, no perfectly useless bit of knowledge with which he may play, is apparently a fit subject for merciful euthanasia.

"But even the busy doctor must relax before the last third of his life. Few minds are capable of keeping up continuously the speed at which the educated physician of to-day must work in the service of the community. There are, and of right ought to be, frequent periods of relaxation. Usually these are spent, and of right ought to be spent, in physical pleasures. For example, in the medical profession are probably more enthusiastic hunters than in any other profession. But hunting comes for short periods only, and with the gradually increasing restrictions of our game laws these periods are becoming shorter and shorter. The fishing season still remains fairly long, but the length of unwarrantable fish is getting longer. Golf in the north, with six months of winter and three months late spring, can claim attention for but a short period. The total length of the closed season on game, fish, golf balls, and even medical society meetings is more than half the year, and one can not always choose the other half when necessity for relaxation is forced upon one. How desirable at these times is the pursuit of some form of perfectly useless book-bourne knowledge, which by its very uselessness gives the desired relaxation. Dr. Osler, that beloved master of medicine, even in his most active years, spent his hours of relaxation in reading things wholly unrelated to medicine, and much of his charm as well as his personal pleasure came from his knowledge of things not medical.

"What are the subjects of useless knowledge in which one may luxuriously indulge one's self not by taking university courses, but by leisure reading and study? One hesitates to mention any of them in the presence of their devotees who would immediately rise and claim for them paramount useful applications. But as the humble learner seeks things out for himself he usually will not go far enough to find the blight of usefulness in astronomy, in geology, in paleontology, in anthropology, in archæology, or in history. Yet each of these subjects, if taken in moderation, gives a man a more perfect orientation of himself in the universe and makes him less sensitive to the petty disappointments of his own or others' abortive attempts at remaking the world in a day. They all teach patience. The record of the slow grinding of the mills of the gods in the making of the universe, in producing a habitable world, in populating it with evolving types of animals, in distributing races of mankind, and in the development of the arts and sciences and of various social

states, in a field of study in which it is delightful to wander. And all the subjects in this field have the additional desirable qualification of offering little temptation to a man having a mere speaking acquaintance with them to show off his modicum of knowledge and to make it pass for profound learning. This is one of the most important points to be considered in the acquisition of useless knowledge for its own sake. The moment one acquires sufficient familiarity with a subject to speak of it learnedly to strangers, the subject has lost its charm of uselessness, since it has become useful to the possessor as a means of publicity. The truest test of personal enjoyableness of useless knowledge is its flavor in solitude. Talk of it much and it becomes like that chastity which has been successfully proven by legal process.

"The appreciation of music, of poetry, of painting, of sculpture, and of art in general are all most delightfully useless accomplishments. True, the appreciation of music in its more strenuous forms is open to the possibility of being useful as a means of public aggrandizement. Not everyone who pays $10 each for grand opera tickets is doing it solely for the love of music. The dress in which grand opera is usually heard is evidence of the usefulness of music as a medium of publicity. But the study of grand opera from the gallery or by one's own fireside with the common garden variety of phonograph is not readily interpretable as a means of seeking social distinction. The perusal of Shelley's 'Cloud' will not make one a neighborhood wonder as a weather prognosticator, but it may give him hours of enjoyment even in times of serious illness. The Art Institute in Chicago and the Metropolitan Museum in New York give more opportunities for the enjoyment of art than the west side of Michigan Avenue, or Broadway at Forty-second Street, though one's presence there is not so useful as a means of ostentation. Parenthetically it is a bit too bad that one is apt to find in the Innis room in the Art Institute on any free admission day more foreign-born than American-born citizens, and that the gold and the jade ornaments in the Metropolitan Museum in New York attract more youthful American visitors than does the Rembrandt room."

Those who have acquired a hobby never regret the time devoted to the acquisition of the "useless knowledge" pertaining to it. The enjoyment of this knowledge comes mostly in the little hours in between one's labors, "in the days of rest, in the days of relaxation enforced by sickness, by overwork, by age." Its acquisition will give some mental association with the great ones of the past. "It will make life worth living when nothing else seems worth while." The saying of Roger Bacon is still true, "Learning maketh a man fit company for himself."

ON THE CONSERVATION OF GAUZE.

At a certain naval hospital during the month of September, 1921, 248 rolls and 65 bolts of gauze were expended at a cost of $678.89. These figures are startling and entirely out of harmony with the present campaign for economy. With a view to ending the extravagant use of gauze at the hospital, the commanding officer caused the following order to be promulgated:

"(1) All requisitions for dressing material to be approved by the chief of service after investigating need of amounts requested.

"(2) All dressing material issued to wards, dressing rooms, and operating rooms to be in the custody of the nurse in charge, who will see that it is used economically and only for purposes intended. The use of gauze for cleaning rags, dusters, etc., and the use of bandages, sponges, etc., for purposes other than dressing material to be absolutely prohibited.

"(3) A surgical dressing expenditure report is to be made weekly to the executive officer by the nurse in charge of each ward.

"(4) The preservation of all used surgical dressing material, gauze, sponges, etc., from wards and operating rooms by nurses in charge is directed.

"(5) The collection of this material is to be made daily by a corpsman especially detailed for this duty. This material is to be carefully sorted and all found suitable for further use prepared in accordance with the directions indicated below. A record of the amount collected and amount salvaged is to be kept and submitted to the executive officer at end of each month.

"(6) All material found suitable for further use will be delivered to the laundry and prepared as follows:

"(*a*) Soak in cold water to remove bloodstains.

"(*b*) Boil in water and soda solution.

"(*c*) Wash in soap and water—dry in extractor and tumbler and put in packages for sterilization.

"(*d*) Sterilize for 20 minutes for three successive days.

"(*e*) Deliver to the dispensary for reissue to dressing rooms and wards."

The effectiveness of this order in the interests of economy is shown by the following tabulation of the expenditure of gauze at this hospital during the months of September, October, and November, 1921:

EXPENDED.

Months.	Rolls.	Value.	Bolts.	Value.	Total value.	Average number of patients.
September	248	$1.33	65	$5.37	$678.89	439
October	196	1.33	57	5.37	566.77	427
November	165	1.33	47	5.37	471.84	483

Surely no further comment is needed.

FIG. 1.—SHARK BITE.

FIG. 2.—SHARK BITE.

FIG. 3.—SHARK BITE.

CLINICAL NOTES.

REPORT OF A CASE OF SHARK BITE.

By C. R. Baker, Lieutenant Commander, and C. W. Rose, Lieutenant, Medical Corps, United States Navy.

E. C. P., private, United States Marine Corps, with two other arines, were in swimming off the Marine Dock, Cape Haitien, Republic of Haiti, about 3.30 p. m., August 22, 1921. All three men d been swimming about the dock in from 7 to 12 feet of water for half hour, when all three climbed up upon the dock with the intenon of diving off the end. E. C. P. was the first to dive, and while was under the water his comrades noticed a shark's tail about a ot above the water line about 5 feet away from where E. C. P. had ved. Both men yelled "shark" and at the same time noticed a redsh object about 2 feet in diameter in the water close by the shark. One man stated he thought this red object was a red fish, the other an said it looked to him like a red cloth. After a few seconds the ark disappeared, and about 10 seconds later the man came to the rface where the shark and red object had been seen and yelled, Brothers, the shark got me." He swam to the dock, a distance of out 12 feet, and was helped up on the dock and carried ashore. n improvised tourniquet was applied to his left thigh, which was eeding profusely from a large, ragged wound.

The patient reached the hospital within 10 minutes. Morphine and ropine were administered, and under ether anesthesia the wounds ere examined, cleaned, sutured, and dressed. There was an extene, curved, deep, lacerated wound with serrated edges on left thigh om just below and anterior to the large trochanter curving downard and posteriorly to the knee joint, across the anterior aspect of igh just above the knee and ending in a funnel-shaped depression the inner aspect of thigh, where there was apparently some loss of sue. The wound went clear down to the femur throughout its length t with no loss of tissue, except that portion of the wound on the inrnal aspect of the thigh. All the muscles and other tissues on the ternal anterior aspect of thigh could be lifted back to the middle ie forming one huge flap. The great sciatic nerve and femoral tery escaped injury; the patient had all the normal movements of e ankle and toes and a good pulse in the dorsalis pedis artery of the fected side. The serrations of the edge of the wound were very

plain in certain areas. The serrations measured about 2 centimeters at their base and about 1½ centimeters long, some ending in a point, while others ended rather bluntly. Figure 1 shows some of the serrations. There were three superficial abrasions over the left calf which were probably due to fins or possibly teeth grazing the part. Figure 2 shows these abrasions very well.

There was practically no hemorrhage after arrival at the hospital. The patient came off of the operating table after 30 minutes etherization with a pulse of 126; severe shock was anticipated and measures were taken to prevent it, but the patient died in shock at 9.15 p. m. that night.

All photographs were taken post-mortem and after embalming the following morning, and are therefore not as illustrative of the case as they might have been had it been practicable to take the pictures upon his admission to the hospital.

E. C. P. was a strong, well-developed young man, an excellent swimmer, and prided himself on his endurance under water and ability to see under water.

Both eyewitnesses were carefully questioned separately and alone about the affair the morning after it occurred. Both statements were almost identical, as follows:

That E. C. P. before diving from dock stated he was going to break a record for length under water; that he dived into a very large school of small fish, and almost immediately they saw about a foot of the dark, symmetrical tail of a shark sticking out of the water about 5 feet away from where the man had entered the water, followed by the appearance of a reddish object about 2 feet in diameter close to the shark; the shark and the reddish object disappeared in a few seconds, and the man came to the surface, where the red object and the shark had been, about 10 seconds later and cried out "Brothers, the shark got me;" he swam a distance of about 12 feet to the dock where they helped him on to the dock, and carried him ashore, applied an improvised tourniquet made out of a towel, and rushed him to the hospital in an ambulance. Neither eyewitness saw the whole length of the fish, nor did they see the man under water at any time from the time he dived into the water until he came to the surface and cried out, "Brothers, the shark got me." No large fish had been noticed by them previously until the tail appeared above the water.

The large brindle and dark-gray sharks have frequently been seen about the beach of Cape Haitien, according to natives and others, and within the past month a small brindled shark about 3 feet long with a dark-gray symmetrical tail has been killed and hauled ashore to the writers' knowledge.

It must be said that the natives apparently do not fear sharks, nd they are constantly exposing themselves in the waters here-bouts. After inquiring of the old natives and others who have been ere for years, we were unable to find one authentic case of a native aving been attacked. However, we did find one authentic case of erious fish bite in the person of a Syrian, who is a merchant in Cape Haitien at the present time. This case happened about 25 years ago, hen this person was 15 years old. He was wading on the beach with ther boys in about four feet of water, when suddenly he was at-acked, resulting in amputation of his right leg about four inches elow the knee. Neither the victim nor any one else saw what did it.

The writers realize that the evidence in this case is not absolutely onclusive that a shark did the damage; but with the evidence as resented above, together with the fact that the wounds were so ex-ensive, we believe it was a case of shark bite.

A PRACTICAL TREATMENT OF ACUTE ULCERATIVE GINGIVITIS.

By C. R. Wells, Lieutenant, Dental Corps, United States Navy.

In practically every professional periodical which the dental sur-eon of the present day reads, he invariably finds an article on the reatment of acute ulcerative gingivitis, sometimes called Vincent's ngina.

Treatment after treatment is advocated by different men, each resumably believing his to be the best. Most of these methods of reatment advocate the use of silver nitrate, copper sulphate, iodine, alvarsan, or Fowler's solution. A treatment that is simple, effi-ient, and one that can be used without the slightest hesitation and ith gratifying results, has been employed by the writer successfully n several hundred cases. The symptoms presented by the patient nd oral conditions found, such as redness, swelling, ulcerative and ainful gingivae, and buccal mucosa, are familiar to all, therefore ill not be dwelt upon.

The mouth is first thoroughly sprayed with undiluted hydrogen eroxide, then with distilled water, followed by a spray of a satu-ated solution of potassium chlorate. The gingivae and buccal ucosa are now painted with compound tincture of benzoin and a last of air is blown over the tissues to dry the medicament. Care ust be taken to get the tincture of benzoin well up under the ingivae, which is best done by the aid of an applicator. A mouth ash of a saturated solution of potassium chlorate is employed for ome treatment, the patient being instructed to use it five times aily, namely, on arising in the morning, after each meal, and

before retiring at night. He is given three grains of calomel in one-tenth grain doses and instructed to take one every half hour until all are taken; this is followed in two hours by a saline cathartic. He is instructed to stop brushing his teeth with a toothbrush. The teeth are to be cleansed by wiping them with a piece of sterile gauze saturated with the solution of potassium chlorate until the disease is cured.

Some attention must be paid to diet, therefore vegetable soups and milk only are recommended for two days. Smoking is prohibited.

On the day following the initial treatment the calcareous deposits are removed from the teeth and the same treatment is continued, with the exception of the calomel.

One hour after the initial oral treatments all pain usually subsides.

Four days of treatment will usually cure the most obstinate cases, providing the patient carries out the home treatment and diet prescribed.

REPORTS.

A REPORT ON THE INTERNATIONAL STANDARDIZATION OF SERA.[1]

A conference was recently held in London under the auspices of the health committee of the League of Nations in order to discuss the standarization of sera. The delegates to this conference, however, were not exclusively drawn from countries within the league.

The reports by the subcommittees in connection with diphtheria and tetanus, meningitis, and pneumonia, dysentery, and syphilis are as follows:

THE RECOMMENDATIONS OF THE SUBCOMMITTEES.

1. Subcommittee for antidiptheritic and antitetanic serum.

The committee for investigating methods for testing the potency of antidiphtheritic and antitetanic serum considers it both possible and desirable to fix for both these sera an antitoxin unit which could be generally accepted and acknowledged as an International Unit.

Diphtheria antitoxin.—Two units are used at present:

(*a*) The German, determined in the Frankfort Institute for Experimental Medicine, following the Ehrlich method with standard serum, and

(*b*) The unit determined in the Hygienic Laboratory of the United States Public Health Service at Washington.

Between these two units, according to the experiments carried out to date, there are only very small differences. To determine these differences accurately the standard sera and test toxins for the necessary researches will be given to the various participating institutes both by the Frankfort Institute for Experimental Medicine and the Hygienic Laboratory in Washington.

The result of the experiments performed with these sera and toxins at the several laboratories represented will be delivered on completion to the Danish State Serum Institute, which for this purpose will act as the central laboratory.

Tetanus.—Four methods at present are employed to describe the potency of antitetanic toxin. These four methods start from different points of departure and experiments have not yet determined the exact relation between the units determined by each of these methods.

[1] From the Lancet for Dec. 24, 1921.

The committee consider, however, that it is desirable and possible to establish a common measure by an agreement on a single standard antitoxin, using the principle which has been adopted in connection with the standardization of antidiphtheritic serum.

In the first instance the participating laboratories must fix experimentally the relations which obtain between the four units at present employed.

With this object in view an exchange of sera and toxins will be made in order to secure the necessary comparative experiments. The details of the experiments made with each method will in all cases be described in precise detail. All the relative documents will be sent to the Danish State Serum Institute, which for this purpose will act as the central laboratory, and the results will be discussed at a subsequent conference.

II. Subcommittee for antimeningococcus and antipneumococcus serum.

(*a*) *Antimeningococcus serum.*—The subcommittee have unanimously agreed as follows:

1. With the object of obtaining full information regarding the various types of meningococci, the several laboratories mutually agree to exchange agglutinating serums and strains of meningococci, the latter being obtained exclusively from the cerebrospinal fluid of meningitis cases.

2. Macroscopic methods will be employed in agglutination investigations, the bacterial emulsions having been kept for 24 hours at a temperature of 37° C., without prejudice to other methods which may also be employed. Investigations into the saturation of agglutinins may be carried out by any method.

3. In the existing state of our knowledge and without prejudice to the opinions of the several institutes participating in these researches and who are not represented at this conference it appears to be difficult to determine the therapeutic value of antimeningococcus serum by measurement of agglutinins, sensitizers (sensibilisatrices), and opsonins.

4. Fresh experiments will be undertaken in the various laboratories regarding the value to be attached to the determinations of antiendotoxic and bactericidal power.

(*b*) Antipneumococcus serum.—The subcommittee have unanimously arrived at the following conclusions:

1. A mutual exchange of cultures of different strains of pneumococci will be effected in the same manner as agreed upon in the case of meningococci.

2. Researches into the agglutinating power of antipneumococcus serum is of no value in determining its therapeutic power. The best

method of titrating the serum is the measurement of the bacteriacidal power in animals, preferably mice.

3. New investigations will be carried out with regard to (*a*), the best method of inoculation—peritoneal or subcutaneous—for the titration of serum; (*b*) the selection of methods, preventive or simultaneous, for the injection of serums and cultures; (*c*) the monovalence or polyvalence of the different serums.

III. Resolutions adopted by the committee on dysentery serum.

1. It was agreed that it would be advisable that the different institutes, laboratories, etc., should exchange samples of serum and toxin and that further experiments should be carried out, using for these—

(*a*) Different methods of titration.

(*b*) Different species of animals.

2. In testing the potency of sera, there was a general agreement that the antitoxin, especially the antiendotoxin, should be estimated, and there was general agreement that this could be accurately carried out equally well with dead bacilli as with toxin. In reference to the method of testing the dysentery serum on mice, it was recommended that a series of tests should be carried out with the standard serum which the Frankfort Institute would supply, comparing them with methods in use in the various institutes, and that a report on these experiments should be presented at the next conference. But it was considered that it was advisable also to test the antimicrobic power of serum, employing living bacilli for the test.

3. It was unanimously agreed that in the preparation of experimental antiShiga serum the horses should be inoculated with the *B. dysenteriae* (Shiga) only.

4. It was agreed that the question of the preparation and the standardization of sera prepared from various other atoxic dysentery bacilli should not be discussed, as the actual state of our knowledge does not permit us to solve the question in a decisive manner.

IV. Subcommittee on the sero-diagnosis of syphilis.

The recommendations of the committee appointed to discuss this question are:

1. In a certain number of institutes the Wassermann reaction as practiced in them should be compared with the methods of Sachs-Georgi, Meinicke, and Dreyer-Ward ("Sigma").

2. The number of cases examined in each institute should be 1,000 of undoubted syphilis, and 1,000 in which syphilis could be excluded as far as possible.

3. It is also recommended that the different methods should be compared on about (one and the same) 50 cases out of the 1,000 at

different stages of the disease. These repetition tests should be carried out on at least three or four occasions in the course of the disease, and it is recommended that the 50 cases should comprise especially suspected syphilis of the nervous system and of the eye.

4. The worker should be allowed the opportunity of studying the respective authors' own methods in the respective institutes.

5. The places where the tests are to be carried out should be efficiently equipped, and the serologist should be in as close touch with the clinician as possible.

6. For the flocculation tests the serologist should use only those extracts prepared or controlled by their respective authors.

7. The samples of serum to be tested should be known only by numbers, and the serologist should not have access to the clinical or pathological records until the whole series of tests is concluded, but the chief of the laboratory may cause any serum to be retested without making the serologist aware of the fact.

8. A preliminary report to be submitted after the first 500 tests have been concluded.

9. All reports on tests should include information as to

(*a*) Reliability of the method.

(*b*) Complexity of technique.

(*c*) Relative consumption of time by the method.

(*d*) Expense.

(*e*) Ease and accuracy with which the reaction can be observed.

(*f*) Percentage of dubious results.

(*g*) The extent to which the method yields quantitative results.

It is recommended that all the results should be finally submitted to the State Institute for Seropathy of Copenhagen.

It is understood that the conference will meet again in six months' time, probably at the Pasteur Institute in Paris, to report progress and arrive at further recommendations for the organization of international health matters. In the meantime the work of the subcommittee goes on.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Lieutenant Commander L. W. JOHNSON, Medical Corps, United States Navy.
Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.
Lieutenant Commander JOHN HARPER, Medical Corps, United States Navy.
Lieutenant Commander H. E. HARVEY, Dental Corps, United States Navy.
Lieutenant D. COREY, Medical Corps, United States Navy.
Lieutenant E. PETERSON, Medical Corps, United States Navy.

GENERAL MEDICINE.

SULLIVAN, M. X., STANTON, R. E., AND DAUSON, P. P. **Metabolism in pellagra: A study of the urine.** Arch. Int. Med., April 15, 1921.

Certain types of diet have caused pellagra. While its treatment is almost entirely dietary, Hunter, Givens, and Lewis, at the Pellagra Hospital, have concluded that a diet providing 2,500 calories and containing 15 gms. of nitrogen, of which 11 gms. are in the form of animal protein, is not only likely to promote the recovery of the pellagrin but is adequate to meet all the requirements for maintenance and repair of his convalescence.

In this paper the urine was studied. All cases were true pellagrins and the controls were the same cases after they had completely recovered.

The excretion of phosphates was diminished, but as the symptoms disappeared they increased. The total amino-acid nitrogen was normal for acute and convalescing patients. At first the total nitrogen was low, the excretion of ammonia tended to be high, and the ratio of the latter to the former was high. These values became normal with recovery. The total 24-hour amount was reduced and the specific gravity increased, especially in severe cases. The urines showed a low uric acid content, a low creatinin nitrogen, and a low urea nitrogen content. The ratio of urea nitrogen to total nitrogen was low, the creatinin ratio slightly high, the undetermined nitrogen high, and the creatinin coefficient low.

Pellagra may be differentiated into two closely related syndromes: (1) those with marked skin symptoms and little physical deterioration, the dermal type, and (2) those with few skin symptoms but with marked intestinal upsets, general weakness, and paresthesias, the systemic type. The abnormal urinary findings were more marked in the second type.

The utilization of protein as determined in part by the nitrogen balance was found to be subnormal even after several weeks of a remedial diet. All patients showed indicanuria, some to a marked degree. Of the severe and moderate cases 50 per cent showed albumen and casts, though there may be severe cases with no such evidence of kidney damages. (D. C.)

LEVIN, S. **One thousand one hundred forty-six goiters in one thousand seven hundred eighty-three persons.** Arch. Int. Med., April 15, 1921.

One thousand seven hundred eighty-three unselected persons, in living conditions above the average, served by three distinct water supplies, residing in the Great Lakes goiter district, were examined. More than 80 per cent were born there or had lived there more than 15 years. The results are expressed in the following table. Group I indicates physiological hypertrophy, Group II cystomas and adenomas, Group III colloid goiters.

	Total persons.	Total goiters.	Group I.	Group II.	Group III.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*
Males	790	44.9	29.1	15.0	0.76
Females	993	76.6	45.5	30.3	3.84
Total	1,783	64.2	38.2	23.5	2.5

These results did not vary with the water supply. True exophthalmic goiter was rare while hyperthyroidism especially during puberty and the menopause was common. The occurrence in age gives a steadily increasing curve to puberty where it reaches its height in both sexes but continuing at that height, or slightly below, in females (above 80 per cent), while in males it drops off with a slight rise at 42 years, from then on gradually decreasing. In women, the increased demands on the thyroid of the child-bearing period and the menopause serve to keep up the percentage. After 35 years of age the adenomas and cystadenomas serve to maintain the percentage and this corresponds to the age at which most other neoplasms develop. In families with four or more children it was found that the presence of goiters in both parents resulted in many goiters among the children. Many women with large exuberant thyroids gave birth to infants with enlarged thyroids which subsided after one or two weeks, even though they were breast fed. Nongoiterous mothers never gave birth to goiterous infants. Excepting in rare cases of thyroiditis, focal infection seems to have no bearing, especially as goiters disappear in many when absent from this section.

In this region goiters are more common among those living in poorer hygienic surroundings. (D. C.)

GRAY, G. A., AND MEYER, B. L. **Diphtheria carriers and their treatment with mercurochrome.** Jour. Infect. Dis., April, 1921.

Several cases of diphtheria having occurred at the United States naval hospital, Mare Island, Calif., all the personnel and patients admitted were cultured. Of 680 persons examined, 23.8 per cent were carriers. This high percentage was probably due to the fact that diphtheria was endemic in near-by towns. Mercurochrome–220 in solutions of 0.5, 1, and 2 per cent was selected as a germicide in the treatment of carriers. It is important that the germicide reach all parts of the mucous membranes of the nose, pharynx, and tonsils. Of these carriers, 90 were treated thoroughly and systematically twice daily with mercurochrome–220. Eighty-eight of these were made carrier free, with an average of 19.1 treatments and an average of 12.7 sick days. Two were unaffected.

Of the remaining 51 carriers some were not treated systematically and others were treated with various agents. Of these, only 16 have been rendered carrier free; 10 complained of irritation from mercurochrome, described as a feeling of congestion in the nose. The 1 per cent solution was used routinely, 2 per cent in resistant cases, and 0.5 per cent in those who complained of irritation. The solution is applied to the nasal tract by means of a medicine dropper and to the throat and tonsils on a swab. (D. C.)

GETTLER, A. O. **A method for the determination of death by drowning.** Jour. Am. Med. Assn., November 19, 1921.

The method suggested by Gettler depends upon the difference in the chemical composition of the contents of the right and left chambers of the heart. In case of drowning the blood in the left heart is diluted by absorption of the drowning fluid from the lungs. It has been shown that no water can get into the left heart if the individual is thrown into the water after death.

The inorganic constituents of the blood are not affected by postmortem changes and hence can serve as a fairly dependent criterion. The method of Gettler's depends upon the difference of the chloride content in the two chambers.

THE METHOD IN DETAIL.

"The pathologist should be supplied with two clean, dry glass bottles of about 30 cubic centimeters capacity, labeled, respectively,

right and left (no anticoagulant is used); two clean, dry 25 cubic centimeter pipettes from which the tips have been broken off and the ragged edges rounded in a flame (the object of this is to have a large opening so that there is less chance of a small clot obstructing the opening); also a rubber tubing with glass mouthpiece for attaching to pipettes when drawing up the blood. The heart, while still in place in the cadaver, is wiped dry with a clean towel, and a small slit is made with a clean, dry knife in the right ventricle. The pipette with rubber attachment is then inserted into the heart, through the incision, and careful suction is applied. If the blood does not enter the pipette readily, the latter is carefully moved into different positions within the heart chamber until the end of the pipette rests within the blood. When from 5 to 10 cubic centimeters of blood is in the pipette and while suction is still being applied, the rubber tubing attached to it is pinched tightly to prevent the blood from returning to the heart. The pipette is then drawn from the heart and the contents emptied into the vessel marked 'right.' This vessel should be stoppered, labeled and sealed. With another dry knife the left chamber of the heart is opened and the contents are put into the bottle marked 'left,' exactly the same technic being used.

THE ANALYSIS IN DETAIL.

"Pipette carefully 3 cubic centimeters of the blood into a clean, dry Erlenmeyer flask; if the blood is badly clotted, accurately weigh 3 grams. Add 27 cubic centimeters of distilled water and 30 cubic centimeters of saturated picric acid. Mix well and let stand 10 minutes; then filter through dry filter paper. Pipette accurately 40 cubic centimeters of this filtrate into another dry Erlenmeyer flask and add 10 cubic centimeters of M/29.25 silver-nitrate solution.[1] Mix thoroughly and allow to stand, preferably overnight. Then filter and pipette 20 cubic centimeters of this filtrate into a clean casserole. Add 4 cubic centimeters of the starch-citrate mixture[1] and titrate with the standard M/117 potassium iodide solution.[1] (Austin and Van Slyke.)

"Calculation: $125 \times \left(8 - \frac{\text{c. c. KI used}}{2}\right) = \text{mg. NaCl in 100 cubic centimeters.}$

[1] The silver nitrate solution contains, per liter, 5.812 grams of $AgNO_3$ + 250 cubic centimeters of concentrated nitric acid. The starch-citrate solution is made as follows: Dissolve 2.5 grams of soluble starch in 500 cubic centimeters of warm water; then add 446 grams of sodium citrate and 20 grams of sodium nitrate and heat until all are dissolved. Filter while still hot through cotton; allow to cool and make up to 1 liter. The potassium iodid solution contains 1.419 grams in 1 liter.

ALTERNATE METHOD.

"For precipitating the protein and formed elements, tungstic acid s used, and the technic of Folin and Wu is followed. The method is as accurate as the picric acid method:

"Pipette 5 cubic centimeters of blood into a dry Erlenmeyer flask; add 35 cubic centimeters of water; mix thoroughly. Then add 5 cubic centimeters of 10 per cent sodium tungstate, mix well, and add 5 cubic centimeters of $\frac{2}{3}$ $N.H_2SO_4$. Stopper with a well-fitting rubber stopper and shake vigorously for five minutes. Filter through dry paper into a dry beaker. Pipette 20 cubic centimeters of the filtrate into another clean, dry beaker, add 10 cubic centimeters of M/29.25 silver-nitrate solution, mix well, and let stand, preferably overnight. Then filter through dry paper and pipette 15 cubic centimeters of this filtrate into a casserole. Add 4 cubic centimeters of the starch-citrate mixture, and titrate with M/117 potassium iodide solution.

"Calculation: $100 \times \left(10 - \frac{\text{c. c. KI used}}{2}\right) = \text{mg. NaCl in 100 cubic centimeters.}$"

A series of 41 cases are given showing the accuracy of the method. Whenever the drowning occurred in salt water the chloride content of the left heart chamber was higher and when drowning occurred in fresh water the chloride content of left heart chamber was lower than in the right heart chamber.

The author gives the following summary and conclusions:

"The new method for demonstrating the presence of drowning fluid in the left heart, given in the foregoing, depends on the microchemical determination of the chloride content in the heart chambers.

"Forty-one human cases have been investigated by this method. Eighteen of these were actual drowning cases; 3 of the 18 persons were drowned in fresh water and 15 in salt water.

"A difference in the chloride content of the two heart chambers exceeding 25 milligrams indicates that the individual was drowned.

"Persons who are submerged while alive and die of shock during the first stage of drowning may not show this difference in chloride content. Such cases, however, are rare.

"This method is the most specific so far devised for proving that death was due to drowning." (E. P.)

PETER, T. B. **Strain in spirochetes.** Am. J. Syphilis, January, 1921.

The question of strain in spirochetes is a momentous one from the standpoint of treatment and prognosis. Malignant types, cases sub-

ject to peculiar perversity in relapses, and strictly nervous types of the disease have led to the assumption that there are special strains of the organisms. The question is still in abeyance in the minds of those who have most thoroughly studied the question. If malignant syphilis is due to lowering of tissue tone of the host then why is it contracted by robust individuals in perfect health or from individuals with mild cases? Malignant syphilis has a peculiarity in that it frequently registers a negative Wassermann reaction. The question of robustness and physical vigor is not always that of outward seeming. It is the question of body cells and not musculature which determines the resistance of an individual. Nothnagel has observed that apparent vigor is not always combined with ability to resist disease. In the opinion of Basserau and others malignant syphilis almost invariably follows phagedenic chancre and phagedenism is due to cachexia or inherent tissue weakness. The supporters of the belief of special strain in spirochetes find most of their evidence in syphilis of the nervous system.

When syphilis attacks a race in which it was hitherto unknown nervous involvement is rare. The prevalence of nervous syphilis in white civilized races has been ascribed to three causes, the difference of strain in spirochetes, the state of civilization—greater intellectual activity and the degree of immunization. The author holds that the first is unlikely because the noncivilized races have contracted the disease from the civilized races, the second is more reasonable, for the nervous system is more highly developed and subject to more stress in civilized races, the third is in a measure true, as syphilis is more attenuated than formerly except in the case of the Mongolians. Nonne is of the opinion that nervous syphilis is due to the actual presence of spirochetes in the nervous system, but does not believe that there is any proof of any specificity of strains. Conjugal syphilis, together with numerous cases of nervous syphilis developing in several individuals from the same contact, are given as proof of the strain theory, but the author does not believe that they prove the existence of a special strain of spirochetes with a selective action on the nervous system.

Noguchi has cultivated three different strains of spirochetes varying in thickness, undulations, and agility, which produced different reactions when grown in the testicles of rabbits. He is of the opinion that these morphologic and pathologic variations may constitute racial differences within the species. Zinsser, Hopkins, and McBurney grew five strains which showed differences in virulence, period of incubation, and the character of lesions produced, but, in their opinion, this was not due to any particular strain but to the following factors:

1. Type of lesion from which the organism was obtained.
2. Development of inoculated testicle.

3. Technic of inoculation. The greater the maceration of the tissue injected the greater the virulence.

4. Interval between removal of inoculating material and its further inoculation.

5. Whether the spirochetes developed in the testicular substance or in the sac.

Other observers state that a dermotrophic and a neurotrophic strain can be produced at will and further that animals inoculated with one can develop a new primary lesion when inoculated with the other. The foregoing shows that spirochetes are capable of many variations in morphologic character and clinical display. The extreme tenuity of these organisms offer many difficulties in the way of discrimination, and errors of observation are extremely difficult to avoid. The statements of observers, even the most competent, must therefore be received with a certain amount of reserve. There are numerous spirochetes closely resembling *Spirocheta pallidum* and there are several diseases which closely parallel syphilis in one of which, yaws, the organism has been found, *Spirocheta pertenuis*. The author believes that the two diseases may have developed from a common ancestor, their difference having been caused by time and place. In the same way changes may continue in the way of increasing or decreasing virulence or in the selective action in different individuals or under different conditions. This would go far in explaining selective action of spirochetal strains.

The cases of individuals who fail to respond to treatment are explained by the fact that the spirochetes may have become immune to arsenic or mercury. Noguchi has shown in test-tube experiments that the spirochete develops a tolerance for arsenic. Others believe that the failure is due to different life cycles of the spirochetes, one form not being susceptible to the drugs. In conclusion, the question is far from being settled, but the author believes that individual idiosyncrasy will account for all the seeming vagaries of the disease. In other words the selective action of the *Spirocheta pallida* when introduced into the body is governed entirely by the manner in which the tissues of the host react to the invader. (D. C.)

STTENBERG, R. **Hereditary blood qualities: Medico-legal application of human blood grouping.** Jour. of Immunol., September, 1921.

Reviewing the work of other investigators and quoting the results of his own investigations, the author gives the frequency of occurrence of the four blood groups as follows: Group I (45 per cent), Group II (40 per cent), Group III (12 to 15 per cent), and Group IV (2 to 5 per cent). Group peculiarities are permanent throughout

life for each individual (Descatello and Sturli). At birth and during the first month agglutinin is rarely present, but by the first year is usually established and after two years is always established as in adults (Happ).

Several workers, including the author, found that the groupings are hereditary and follow Mendel's law. Data are presented to show that blood grouping, within certain limits, may be used as evidence in cases of disputed paternity, maternity, or illegitimacy of the offspring, a summary of which follows: Unions of Groups I and II give only Group I. Unions of Groups I and II and Groups II and II give only Groups I and II. Unions of Groups I and III and Groups III and III give only Groups I and III. These unions comprise over 80 per cent of all unions.

Unions containing a member of Groups IV and unions of II and III may give rise to offsprings of any group. Likewise a child of Group I may result from any combination of parent groups.

In this work the author uses the grouping according to Jansky, which he states is logical, has priority, and has been officially adopted by the American Association of Immunologists and the American Association of Pathologists and Bacteriologists. (J. H.)

SURGERY.

LERICHE, R. **Some researches on the peri-arterial sympathetics.** Ann. Surg., October, 1921.

Dr. Leriche, of Lyon, France, submits to the medical profession some extremely interesting observations he has made in studies on the sympathetic nervous plexuses included in the external layer of blood vessels, opening up a field of research that may have tremendous bearing on future therapeutic surgery.

The fundamental basis for his researches may be stated as follows:

Removal of the sheath of an artery including the sympathetic nervous plexus, is followed by certain distinct phenomena.

Primary reaction.—That of excitement.

1. The moment the external layer of the sheath is pinched the vessel contracts and pulsation stops.

2. Excision of the sheath is followed by progressive diminution of the size of the artery with marked obliteration of the pulse and narrowing of the capillaries.

3. For a number of hours the pulsation is imperceptible or very feeble, arterial pressure is lowered; the operating limb is colder than the other (3–4° C).

Secondary reaction.—After 3 to 15 hours.

1. Elevation of local temperature of operated limb (2° to 3° C above body temperature). Subjective sensations of heat.

2. Elevation of arterial pressure as compared with other limb.

3. An increased amplitude of oscilations, shown by sphygmomanometer.

The author shows how the excitation of the sympathetic nerve plexus may be provoked pathologically as in Raynaud's disease. He believes that modified circulation is the real cause of phenomena of this nature and that the logical treatment is to modify the peripheral circulation by peri-arterial sympathectomy. The technic is to isolate the artery for 8 to 10 centimeters, to fix the vascular sheath after dividing, to hold one part with a forceps and dissect off the cellular tissue either with knife or cannular sound until there has been affected complete denudation of the vessel, which becomes greatly reduced in size.

The author has performed this operation 64 times and has been successful in producing the desired result several times, as in Raynaud's disease, trophic troubles with ulcers, trophoedema, painful stumps.

He explains the main action of the sympathectomy as being due to the late secondary changes with vaso dilation, local elevation of temperature and blood pressure, all favoring healing.

The author in conclusion speaks about the possibility of applying this knowledge to the production of local active hyperemia in internal organs, that are becoming insufficient, in order to improve their physiological function. (E. P.)

GAINBRIDGE, W. S. **Some factors in bone repair.** Jour. Roy. Army Med. Corps, London, December, 1921.

In a somewhat lengthy paper on some of the factors which are concerned with bone repair, after reviewing the modern mechanical appliances used in the management of fractures of the long bones, the writer warns his readers to keep in mind the fact that the union of fractures depends upon a number of factors entirely outside of the adjustment of the broken bone.

When confronted with the task of restoring the integrity of a fractured bone, it is necessary for the surgeon to consider the patient as a whole so as not to overlook certain factors which militate against bone repair. Among these factors may be listed:

(*a*) Endogenous infections in the bone marrow which may lead to local congestion and disintegration.

(*b*) External infection extending beneath the periosteum or through the marrow spaces, causing more or less necrosis of bone.

(*c*) Focal infections especially in the tonsils, the teeth, the accessory nasal sinuses, in the genitourinary tract or the gastrointestinal tract.

(*d*) Constitutional diseases such as tuberculosis and syphilis.

The hematoma about a fractured bone has an important office in the production of the callus, hence the loss of the extravasated blood has an undesirable influence upon the repair process. On the other hand, aside from the danger of infection from without or within, the hematoma may exert an injurious pressure upon the neighboring organs, causing congestion and lymphstasis, which are further increased by muscular inactivity. This retardation of the blood—and lymph—current involves a more or less imperfect nutrition of the surrounding tissues and at the same time exposes them to the danger of *autoinfection*.

The softness of the callus requires some fixation of the injured limb. The *rest*, however, which is needed for the reunion of the broken bone retards the blood and lymph flow, while condemning the muscles to inactivity and exposing them to the danger of atrophy of disuse. For this reason, as soon as possible during fixation, functional treatment should be instituted in the form of exercises of the muscles, tendons, and joints, so that their recovery may proceed along with the repair of the fractured bone and thus obviate the persistence of injured muscles and stiff joints. The muscles and joints must be given the benefit of early massage and judicious exercises chiefly in the form of active movements in small excursions.

The fact is not always appreciated that the complete repair of the broken bone does not necessarily coincide with a complete functional cure, but really does so under the most favorable conditions, whereas months or even years may intervene in other cases. The less the soft parts have been damaged, the more they have been exercised during the repair of the bone, the more likely they are to recover together with the bone. On the other hand, when the soft parts, especially the muscles, tendons, and tendon-sheaths have been badly damaged, perhaps with involvement of adjacent joints, a functional cure is delayed and may remain incomplete for a long time.

There is reason to believe that a deficient or faulty action of internally secreting glands may be in part responsible for delayed union or nonunion in fracture of the long bones. The glands specially involved in the ossification process are the thymus, the thyroid, the parathyroids, the suprarenals and the pituitary gland, and the question naturally arises if the administration of carefully selected endocrinic extracts might not be advantageously introduced as a routine feature into the treatment of fractures of the long bones.

Vitamines play a leading rôle in bone repair, hence the necessity of a diet rich in these nitrogenous bodies.

The absence of the normal bone salts is demonstrable in many cases of delayed repair, and the value of calcium triple phosphate as a stimulus to osteogenesis has been pointed out by Albee and Morrison, in whose experience the injection of 1 cubic centimeter of a 5 per

cent solution into the bone defect of rats, on the third day after the infliction of a fracture, was followed as soon as five days later by the beginning of callus formation shown by X-ray pictures, with union of the bone ends at the end of two weeks, whereas in the controls the defect was not yet bridged over after 30 days and only a slight callus formation was then demonstrable.

Modifications of the regional blood supply incident to fracture play an important part in the repair of the lesion and in order to obtain the best results in the treatment of fractures, practical application must be made of the fact that the normal circulation, nutrition, and mobility of the injured limb must be maintained as far as possible, thereby insuring the vitality of the parts and favoring the formation and solidification of the callus while guarding against the wasting of muscles and the stiffening of joints. (W. M. K.)

TRUESDALE, P. E. Operations on the gall-bladder and bile ducts. Rhode Island Med. Jour., June, 1921.

Truesdale's observations are based on 650 operations on the gall bladder and bile ducts.

Cholecystitis is a very common disease. It is apparently increasing in frequency because it is recognized more often. It is encountered more often than appendicitis in patients over 25 years of age. Like appendicitis it is a disease caused by infection and the channels through which this occurs are now believed to be the blood stream and lymphatic vessels. The relation between typhoid and biliary infection has been firmly established since 1880.

The biliary system serves as one of the supply stations in the digestive tract. While the first parts of the alimentary canal are under direct control of the central nervous system, this control is less in the duodenum and small intestine, the control here being local or chemical and independent of the central nervous system.

Hence gall-stone disease in its incipiency disturbs digestion. The early symptoms are gastric, not hepatic. In cholecystitis, as in appendicitis, the symptoms may be gastric for months or years before attention is directed to the real source of the trouble. The rôle of the pylorus is not fully understood, but it is probable that at the onset of an attack it is in a state of spasm. In chronic cholecystitis pylorospasm is less severe but more continuous.

The character of the pain in acute cholecystitis should be carefully studied. It may be a dull, localized discomfort or an acute, severe pain. The pain is diffused over the epigastrium, occasionally referred to the right subscapular region. It often comes on suddenly in the early morning hours and is relieved by hot drinks, vomiting, or perhaps only by morphia.

Operation should not be urged on people who get along well on medical treatment. The course of the disease is often progressive but not always so. But where the real enjoyment of life is lost and danger is imminent, operation is advisable.

The standard operation is cholecystectomy. Discussion lasted nearly a decade before the wisdom of cholecystectomy as a routine procedure was established and the rare indications for cholecystostomy accepted. If an infected gall bladder is causing enough trouble to warrant operation, it should be removed. The reaction is no more severe, the convalescence is much more comfortable, and the mortality about the same. There is a growing tendency to omit drainage of the gall bladder region whenever it appears safe to do so. Cholecystectomy for cholecystitis is a simple and safe operation. When done for cholelithiasis it has a mortality of about 2 per cent, unless it is complicated by pancreatitis, suppuration, or cancer. (L. W. J.)

Bartlett, W. **Operative procedures for the different kinds of goiter.** Jour. Missouri Med. Assn., August, 1921.

Bartlett shows the need of adapting the operation to the individual and describes his customary procedures.

Hot-water injections or peripheral ligations are reserved for the sickest patients, who are always kept in bed for some time before any operation is done. The operation is done in the patient's room to minimize the risk of moving and the psychic shock. Local anesthesia is always used, one per cent novocain without adrenalin.

One lateral lobe is removed in patients who are well enough to stand a very few minutes of radical surgery. This is done through a lateral incision along the anterior border of the sternomastoid, the wound is left wide open and often the clamps are left in place to save time. This operation is done in the patient's bed and local anesthesia is always used.

Both lateral lobes and the isthmus are removed through the collar incision, but the wound is left wide open in certain patients who are hardly good risks. These operations are done in the operating room under local anesthetic.

In simple goiters without systemic symptoms an almost complete removal of both lobes and the isthmus is made through the collar incision which is closed without drainage. These are operated on in the operating room under local or general anesthetic. Bartlett never uses a general anesthetic for any goiter work.

A valuable postoperative therapeutic measure is the ice pack, suggested by Crile. (L. W. J.)

BRANDON, W. L. **Treatment of varicose ulcers.** Jour. Missouri Med. Assn., August, 1921.

This treatment can be used while the patient is up and about.

Glycerin	ounces	28
Water	do	40
Zinc oxid	pound	1
Gelatin	do	1

Mix the glycerin, water, and zinc oxid and put on the stove. Let it boil and slowly add the gelatin, with constant stirring. When all the gelatin has been added and mixed thoroughly, remove from stove and cool.

To use, warm until it becomes soft, put two 3-inch bandages, loosely rolled, into the mixture. Remove the bandage from the warm mixture and apply it to the leg, from the toes to the knee. Allow this to remain 8 to 10 days, then renew. (L. W. J.)

BLOODGOOD, J. C. **Cancer of the tongue: A preventable disease.** Jour. Am. Med. Assn., October 29, 1921.

Dental journals recently contained a notice to the dental profession from Dr. Bloodgood that it was largely within the province of the dentist to discover and warn the patient of the existence of precancerous lesions of the tongue, because with early attention it is often possible to prevent the development of this dread disease. In any event the warning would serve to call the attention of the patient to the advisability of medical consultation.

Dental officers in the naval service are often on isolated duty as far as their profession is concerned, and therefore this article should be of particular interest to them. Fortunately it is within the reach of all, for the author kindly states in a footnote that a reprint of the article may be obtained from him at 904 North Charles Street, Baltimore, Md. (H. E. H.)

TROPICAL MEDICINE.

ALM, A. C. **La maladie des oedèmes à Java.** *Bull. Soc. Path. Exot., June 8, 1921.* Trop. Dis. Bull., November 15, 1921.

In view of the recent investigations by Mann, Helm, and Brown regarding an edema disease in Haiti (Jour. Am. Med. Assn., vol. 75, 416), the following note about a somewhat similar condition in Java may be of interest:

"This disease was first noticed in the villages in 1918, and in 1919 several patients sought admission to hospital for it, chiefly because of scarcity of food. In three months, of 600 admissions 137 were cases of edema. In 87 instances it was not possible to attribute the condi-

tion to ankylostome infection or any known disease, and of the 87, 8 recovered, 12 were in fair condition at the end of three months, and 47 had died. The disease occurs in both sexes at all ages. The edema appears at first on the feet and lower limbs—later elsewhere. The genital parts are often greatly swollen. Emaciation, almost always present, is masked by the edema. The skin is dry and the nails lose their gloss. The knee jerks are normal and no paralysis has been seen. At autopsy the organs are found atrophied. Death, when it occurs, is with extreme enfeeblement and diarrhea.

The disease is due to defective diet. Van Langen found that there was a lack of the lipochrome, lutein, in the blood and a great deficiency in fat. He attributes the disease to a lack of fat in the dietary. From the beginning of 1917 rice rose in price for various reasons attributable to the war and the Javanese were driven to less nutritious foodstuffs, such as manioc. Since then there have been epidemics of influenza and cholera, the result of which was to aggravate the poverty as well as to send up the mortality rate. In 1919 this was 45.6 per 1,000. The number of persons with edema is now decreasing." (E. P.)

MANSON-BAHR, P. H. **Dysentery: A review of the literature of the last six years.** Trop. Dis. Bull., November 15, 1921.

Recent war conditions caused a marked interest in dysentery and gave the profession unprecedented opportunity to study this disease. In the present review, Manson-Bahr deals with the bacillary type. A few of the more important findings are as follows:

The author shows how the disease occurred in all fronts, both in Europe and in the Tropics. In the discussion of the bacteriology Shiga's bacillus is emphasized as being the one responsible for the most severe and fulminating types of dysentery on all fronts. The Shiga bacillus was also found by Dold, in China, to occur as a natural infection in dogs.

The author finds that little has been written upon the pathological aspects of this disease. The ragged ulcers that form in the large bowel vary considerably in size, rarely penetrate the *muscularis mucosa*, and consequently perforation of the peritoneum seldom takes place.

The general sypmtoms present infinite variations, depending on the severity of infection. The most common complication is arthritis (especially of the knee joint); iridocyclitis, and conjunctivitis may occur.

Recent investigations show the importance of microscopic examination of the stool and a study of the cellular exudate, the charac-

eristics of the bacillary stool, being the abundance of the polymorphonuclear leucocytes. (See following review.)

Teague and Clurman have introduced a method of preserving feces for delayed examination by emulsifying with double volume of 30 per cent glycerine in 0.6 per cent saline, this procedure preventing the dysentery bacilli from being overgrown by coliform organisms.

With regard to the serum treatment, there seems to be some proof of its efficacy in acute cases, whereas it is unsatisfactory in chronic cases.

The convalescent carrier is the main source of danger to the community, the carrier state being able to persist for years (three years). The house fly has been shown to be capable of excreting the organisms for as long as 48 hours. (E. P.)

ANDERSON, J. **A study of dysentery in the field.** Lancet, London, November 12, 1921.

From a careful consideration of the cytology of the exudate in the stool in 15 cases of acute bacillary dysentery and 5 cases of amœbic dysentery, Anderson submits the following percentage averages:

	Polymorph-leucocytes.	Large mononuclears.	Lymphocytes.	Eosinophiles.	Macrophages.	Epithelial cells.	Plasma cells.	Pyknotic cells.
Acute bacillary dysentery.....	90.69	1.61	2.80	0.01	1.80	1.48	1.61	.....
Amœbic dysentery	7.5	.7	2.5	3.2	.....	1.3	1.8	83

The marked features of difference are seen in the number of polymorph leucocytes, eosinophiles, and pyknotic cells in the two conditions. From these findings the author concludes that emphasis should be made on the cytological picture of the exudate in attempts to make an early diagnosis of the type of dysentery. (E. P.)

SPENCER, R. R. **A note on the natural immunity of wild rats to plague.** Public Health Reports, November 18, 1921.

Spencer inoculated 434 wild rats from Mobile, Ala., with the plague bacillus and found that 43.8 per cent (25 of 57) were immune to cutaneous inoculation and 30.2 per cent (114 of 377) to subcutaneous inoculation. It is reasonably safe to assume that these rats had never been exposed to infection as "post-mortem examination of over 4,200 rats had been made a few months before without finding a trace of plague infection and also because no human cases have

ever been reported from that port." Two of the rats were of the species *M. rattus;* and the remainder *M. norvegicus.* Both specimens of *M. rattus* succumbed to plague. (E. P.)

THOMSON, M. B., AND ROBERTSON, A. **Charcot-Leyden crystals in the stools as an aid to the diagnosis of entamœbic dysentery.** Jour. Trop. Med., November 15, 1921.

Because of the marked difficulty in many cases in making a specific diagnosis in chronic amoebic dysentery and so giving the patient the advantage of early treatment, Thompson and Robertson believe that more attention should be paid to the macroscopical and microscopical appearance of the stools (in addition to looking for the amoeba). The authors recommend that more study be given to the comparatively frequent finding of Charcot-Leyden crystals in these stools and their significance and that the presence of these crystals in 20 to 25 per cent of cases of entamoebiasis ought to play a more important rôle in making an early diagnosis. (E. P.)

CASTELLANI, A., AND WILLMORE, J. G. **Glycosuria of malarial origin.** Jour. Trop. Med., November 15, 1921.

Castelliani and Willmore describe two cases of glycosuria (one so severe as to resemble true diabetes) that apparently were purely of malarial origin. They were cured by the administration of quinine in full doses without any dietetic treatment. (E. P.)

SIMMONS, J., AND BOLIN, Z. E. **Dermatitis venenata produced by an irritant present in the stem sap of the mango. (Mangifera indica L.)** Am. Jour. Trop. Med., November, 1921.

The authors show how the fresh sap from the stem of the mango contains an irritant which is capable of producing a dermatitis similar to that caused by plants of the Rhus family. They further contend that the previous conception of mango rashes as being a result of protein sensitization can not be maintained, as no proof exists that the irritant action of the fresh sap was considered or that steps were taken to avoid it.

Thirteen actual cases were studied and numerous experiments made. The authors give the following summary of their work:

"Mango dermatitis is characterized by itching, erythema, intense edema, macules, papules, vesicles, and pustules, followed by pigmentation, desquamation, and often by definite scar production.

"Experiments show that the lesions are not the result of specific foreign protein skin reactions; but are produced by a nonprotein

kin irritant, which is present chiefly or entirely in the stem sap of ther ripe or green fruit.

"The irritant is not volatile. It is soluble in toluol, xylol, ether, lcohol, chloroform, carbon bisulphide, carbon tetrachloride, and ıethyl alcohol. It has not been found in either fresh or old bark tree ıp, or in old, dark, gummy stem sap. It is probably destroyed by an xidase present in the stem sap.

"No marked differences were noted in the amounts of irritant resent in stem saps from mangos of different varieties.

"The dermatitis is most commonly seen in children and in certain ısceptible adults. Variations in susceptibility are probably influ- ıced by differences in the thickness and condition of the skin, and ı the amount and state of the irritant.

"The most efficacious treatment used here has been early applica- ons of ether, followed by 95 per cent alcohol, to remove the soluble ritant and the use of a lotion containing phenol, to allay itching. either ether alone nor fatty ointments should be used because of ıe danger of spreading the irritant.

"Seven of thirteen cases studied were extremely susceptible to rhus ɔisoning. In the remaining six cases there was no history of rhus ermatitis, nor of contact with the plant. Of these six cases, two had reviously had fish poisoning and one strawberry poisoning.

"Mangos may be eaten even by susceptible persons without danger developing dermatitis if care is taken to avoid contact with stem p." (E. P.)

SPRUIT, C. B. **The treatment of trichuriasis with Leche de Higueron.** Am. Jour. Trop. Med., November, 1921.

It seems that the sap of the white fig tree has been used for some me as a specific for trichuriasis in Colombia. Spruit reports the eatment of 30 cases of this disease with "Leche de Higueron," re- ılting in the passage of the trichuris in 57 per cent of the cases. ighteen of the cases were treated in Santa Marta, Colombia, with ıe fresh sap and twelve in Costa Rica with juice preserved in chloro- ɔrm. The dose given varied from 16 to 30 cc., repeated in two ɔurs, and followed by a purgative. (E. P.)

EDERGAARD, N. **Malaria in eastern Cuba.** Am. Jour. Trop. Med., November, 1921.

The sanitary conditions on the large sugar plantations in eastern uba apparently present problems that need close study and inten- ve application of our modern science of sanitation in order to bring ɔout a change for the better. Of 5,453 cases admitted to the hos- tal of the United Fruit Co., Preston, Oriente, the blood was exam-

ined in 5,161 cases and found positive for malaria in 97.6 per cent of the cases. Of these, 87 per cent were of the malignant type. Nedergaard says, "The economic aspect of the malaria situation on plantations in eastern Cuba needs to be more fully realized by those concerned. Buildings and quarters for laborers should not be placed without the approval of the sanitary expert. The sanitary squad should precede the various construction gangs, and all should have safe quarters to resort to at night. If the actual cost of inefficiency and losses due to malaria could be calculated, it would be found much greater than the cost of efficient prevention. Furthermore, the time has come when far-seeing industrial leaders begin to see that ultimate success depends as much on the welfare and efficiency of the many that work as on the few that supervise." (E. P.)

BAUMANN, M. **Ueber einen Fall von Filaria loa.** Munchen. med. Wchnschr. September 2, 1921.

Baumann reports a case of Filaria loa infection in which an adult worm lodged in the right upper lid nine years after the infection occurred. (E. P.)

DE SILVA, R. **Dhobie itch produced by inoculating a culture of Epidermophyton rubrum (Castellani, 1909).** Jour. Trop. Med., December 1, 1921.

De Silva isolated *E. rubrum* from a case of dhobie itch and produced the disease experimentally by rubbing a portion of the culture into the scarified skin of a volunteer's arm. A typical patch of dhobie itch developed within a week, and *E. rubrum* was isolated from the lesion. (E. P.)

NOTES AND COMMENTS.

The following interesting and valuable note on the immunization of adults with the diphtheria toxin-antitoxin mixture has been prepared by Maj. Arthur P. Hitchens, Medical Corps, United States Army, Army Medical School, Washington, D. C.:

"Some recent developments in his studies upon active immunization against diphtheria were discussed by Dr. William H. Park at the November (1921) meeting of the American Public Health Association, held in New York City.

"As is well known, the immunizing treatment consists of three 1 cubic centimeter doses of a mixture of diphtheria toxin and antitoxin, the two constituents in the mixture being so adjusted that there is a very slight excess of the toxin. The doses are given at seven-day intervals. Of course, persons whose Schick tests are negative do not require artificial immunization, since they already have enough antitoxin in their tissues, as this test indicates, to protect them against diphtheria.

"Susceptibility to diphtheria (absence of antitoxin in the tissue) having been disclosed by the Schick test, the desirable sequel is immunization. In New York many thousand children have been tested and those giving positive reactions have been immunized. A few adults have also received the immunizing treatment. It has been found that the injection of the toxin-antitoxin mixture causes children no inconvenience whatever, but this is not the case with adults. Older persons not infrequently have very severe reactions; sometimes the local area of redness is extensive and the surrounding subcutaneous tissues are edematous. With such results, although no really serious complications have been reported, the immunization of adults is no longer being advised. The reason for such restriction is chiefly one of policy. Diphtheria is principally a disease of childhood, the higher percentages of susceptibles are among the younger children, they are the ones who need immunization, and they are the ones who show no severe reactions following the injection of the toxin-antitoxin mixture. Since adults do sometimes react severely, if all age groups were injected promiscuously antagonism and prejudice would certainly be aroused.

"Natural immunity to diphtheria, possessed by about 80 per cent of the adult population, is now believed to be due to recovery from slight infections repeated over a period of years. Such implantations

of less than disease-producing doses of diphtheria bacilli stimulate the tissues to make the antitoxin which results in a negative Schick test. At the same time certain persons develop a hypersensitiveness to the proteins of the diphtheria bacillus. This is the reason it is necessary, in performing the Schick test, to make a control injection with heated toxin. Although the reaction of hypersensitiveness to proteins is different in many ways from that of sensitiveness to toxin, separation of the two phenomena may be made satisfactorily only when the reaction due to one of the elements alone can be subtracted from that due to the mixture. The unheated toxin contains both the toxic substance and the bacillary protein; the heated toxin contains the bacillary protein without the toxic substance. Therefore, any reaction elicited by the heated toxin is the result of hypersensitiveness to bacillary protein, it has no relation to immunity to the toxin (upon which immunity to clinical diphtheria depends), and susceptibility to diphtheria is to be considered as indicated by the reaction to the unheated toxin with the reaction to the heated toxin deducted.

"With the attention that has been given to the reactions in adults following the injection of the toxin-antitoxin mixture, the control test and the so-called pseudo reaction assume more than the above noted almost purely negative value. If these severe reactions in adults are the result of hypersensitiveness to the diphtheria bacillary protein, then the pseudo reaction becomes a test for such hypersensitiveness and possibly a measure of its degree. In other words, the control test may indicate what fraction of the usual dose of toxin-antitoxin mixture for children it may be safe to inject into an adult as the initial dose.

"More extensive observations along this particular line are greatly needed at the present minute. So large a proportion of adults are found to react severely, Dr. Park does not even urge nurses to submit to the immunization treatment. They may receive the Schick test, but are treated, if found susceptible, only if, with full knowledge of the possible consequences, they still demand it.

"In considering this decision, we must remember that it concerns exclusively the civilian population in which fully 70 per cent of the cases of diphtheria occur in children under 5 years of age. Comparatively, therefore, the civilian health officer feels that diphtheria in adults constitutes so small a part of his problem it can be practically ignored. In this, the problems of the Army sanitarian are essentially different; he deals only with adults, and he knows that approximately 20 per cent of these are susceptible to diphtheria. Therefore, this most efficient measure must not be discarded without a sincere effort to find a method for its successful application in the Army. Certainly, all physicians, nurses, and corps men who are likely to come into contact with diphtheria should be given the Schick test.

nd the result recorded on their records. An effort should then be ıade to immunize all susceptible persons, using the severity of the seudo reaction as an indication for the size of the initial dose, and hen estimating from this the amounts to be injected subsequently. uch injections must be given only to those who take them entirely oluntarily, and after the possibility of severe reaction has been learly explained.

"In the present state of our knowledge, no mathematical relation etween the severity of the so-called pseudo reaction and the size of ıe initial dose of the toxin-antitoxin mixture can be formulated. Iowever, persons who react severely should not be injected at all r should receive an extremely small amount, 0.1 cubic centimeter of he mixture diluted 1 to 10 with saline. Persons who react mildly ıay be found to take 0.1 without difficulty. The initial dose for dults who show practically no reaction should probably not exceed .2 cubic centimeter. Subsequent doses will depend on the effect of ıe preceding injection. Following a very severe reaction, the amount hould be cut in half; at least, not increased. If the reaction is not evere, the dose may be doubled each time until the maximum of cubic centimeter has been reached. The number of divided doses equired to cause the Schick test to result negatively will depend pon their size. If they are small, six or eight may be required; f only slightly reduced with the final dose a full cubic centimeter, our or five will probably suffice, provided the mixture is up to the tandard in potency.

"The relative efficiency of the treatment can be learned only by epeating the Schick test about six or eight weeks after the final dose f toxin-antitoxin mixture." (Medico-Military Review.)

We learn from the Lancet of December 3, 1921, that a laboratory ıeeting of the Royal Society of Tropical Medicine and Hygiene ras held at the London School of Tropical Medicine, Endsleigh Gardens, on November 17.

Maj. H. C. Brown, I. M. S., demonstrated a method to facilitate he isolation of bacilli of the enteric and dysentery group in dysen- eric stools. By the addition of one part of high titer specific ag- glutinating serum to nine parts of saline emulsion of a small portion f feces, sedimentation of the particular agglutinated, but still liv- ng organisms was obtained with separation from other intestinal acteria. Withdrawal by pipette of a droplet of the sediment and lating on MacConkey's medium secured on incubation a high pro- ortion of colonies of the infecting organism. Culture plates were hown with controls to demonstrate the efficiency of this method as pplied to the isolation of *B. paratyphosus*.

Among other demonstrations, Dr. C. M. Wenyan demonstrated a culture medium for protozoa and other organisms, consisting of a 10 cubic centimeter mixture of 1 part of nutrient agar to 9 parts 0.85 per cent saline, cooled after sterilization to 50° C., to which were added 20 drops of blood obtained with aseptic precautions from the ear of a rabbit by the paraffin method. This medium was less complicated than Noguchi's, and had been found of practical value for the cultivation of *Leptospira haemorrhagica*, *Leishmania donovani*, and *tropica* at 24°–30° C., trypanosomes and flagellate organisms such as *Embadomonas intestinalis*.

The United States Public Health Service has felt it necessary to prevent the too optimistic and extravagant claims recently appearing in the newspapers in regard to the curative effects of chaulmoogra oil derivatives on leprosy. While the use of the oil and of its derivatives has resulted in a considerable number of apparent cures, it is as yet too soon to tell whether these will be permanent.

The ethyl esters of chaulmoogra oil, the use of which has largely supplanted the oil itself, constitute a most valuable agent in the treatment of leprosy. In treating young persons and those in the early stages of the disease, the improvement has been rapid and striking; in older persons and older cases it is less so. Of the cases paroled from the leprosy stations in the Hawaiian Islands so far about 8 per cent have relapsed and returned for treatment. This was to be expected; and on the whole the results have been so favorable as to make treatment of the disease hopeful. But only time can tell.

The variation in virulence of tubercle bacilli under changing environment is of the utmost practical importance. In the Annales de l'Institut Pasteur for September, Calmette, Boquet, and Nègre give an account of experiments conducted with bovine bacilli grown for a long period upon potato in the presence of ox bile. This medium produces a modification in the virulence of the bacilli, which in other respects remain unchanged. The loss of virulence seems somewhat selective, and it is rather surprising to find that it is most marked in the case of the guinea pig, an animal which is normally extremely susceptible. The bacilli still retain the power of provoking sharp reactions, and of producing typical tuberculous lesions in the rabbit when inoculated in sufficiently large doses. The guinea pig appears able to resist very large doses of these bacilli, whatever may be the route by which they are given. A local inflammatory lesion is produced by the larger doses, which may break down

nd become evacuated; subsequently, healing takes place and no eneralized tuberculosis is produced. When introduced intravas-ularly, or into the alimentary tract, after a latent period of some 0 days general symptoms appear, with swelling of the lymphatic lands; but the illness is recovered from. When the animals are illed during the acute period of this illness—and this was the case n many experiments—the bacilli are found in various organs with-ut the characteristic lesions of tuberculosis, instead phagocytosis f the organisms by large mononuclear cells being a prominent fea-ure. The injection of the modified bacilli into an animal suffering rom spontaneous chronic tuberculosis resulted in a reaction akin o that produced by tuberculin, but developing more slowly and ersisting for a greater length of time.

Attempts were made to protect guinea pigs from virulent bovine acilli by inoculation with the modified strain. Where such immun-zing injections were given subcutaneously no apparent protection as conferred, but where a single dose of the modified organisms as injected intracardially, and infection with a virulent strain ttempted a month later, the results were of considerable interest. Whereas control animals succumbed regularly, with large caseous lands and generalized tuberculosis, the immunized animals, at the nd of three months and a half, were alive and apparently in good ealth. When killed and examined no generalized disease was ound, but the glands in the region of the path of infection were ound to be enlarged and, on section, showed a thickened capsule ith a clear, serous, fluid content, containing but few leucocytes and nly occasional bacilli. The authors are guarded about the inter-retation of these results, which are too recent to be anything but rovisional, and they content themselves with the conclusion that the tuberculous infection pursues quite a different course in guinea igs which have received an intracardiac immunizing injection of ile-cultivated bacilli than it does in the controls." Amongst other nteresting points in this valuable paper is the fact that the bacilli ere found in apparently healthy lymphatic glands, in the dog, nree months after the last injection. (THE LANCET, *November 26, 921.*)

From the Lancet for November 26, 1921, we learn that "malaria is nore frequent in Bulgaria since the war, because of the 400,000 in-ected soldiers who came home uncured after their malarial attacks, till carrying gametes in their blood." A severe epidemic was ex-ected in 1919 to follow their return, but, on the contrary, the cases ere unusually few; 1920, however, was the worst year for 20 years. n the spring of 1919, the Bulgarian Government, anticipating a large

increase of cases, set up a malaria prevention inspectorate, on th work of which Dr. S. Konsuloff reports in a recent paper.[1]

"In the different districts of Bulgaria the prevalence of malari in any year varies with the meteorology of the seasons, through thei influence on the breeding of anophelidae. In the plains the mos numerous mosquito is *A. maculipennis;* in the northeast and in th rice fields *A. pseudopictus;* in the southwest in the hills *A. super pictus*, very plentiful around the Struma Valley, especially in ravine and small streams, in small pools full of algae, and in pools, howeve shallow, amongst the pebbles on either side of the streams, but it i not found in the muddy-bottomed pools of the plains; these maculi pennis chiefly affects, though it is also found in the gravelly pool with superpictus, which, however, requires only very small pools t breed in. Superpictus does not shun houses altogether, neither does i crowd into them like maculipennis. Superpictus carries malaria t almost waterless villages to which all water has to be carried, as i can breed in the tiniest puddles left in ravines and broken ground so in Crete, and in Greece, too, the most malarious districts are no those with obvious marshes. It will be seen from the Bulgarian work here summarized, that the personal details of the mosquito's life ar a determining factor in the vagaries of malarial prevalence. Th annual course of mosquito development begins in April, when th females which have hibernated commence to lay their eggs. As th temperature is low these develop slowly (not at all below 53° F only slowly up to 60° F.) and the mosquitoes of the first brood ap pear in the end of May or the beginning of June. Twenty days there after the new females begin to lay, and the second brood appears i July, the third arrives from the middle of August to the middle o September; there may be a fourth, but the temperature is by thi time too low to permit the development of the malarial parasit The third brood often fails because the streams in July have drie up and there is no water for the larvæ—this, of course, does not appl to the rice fields, where the water level is artificially maintained. I can now be explained why there was so little malaria in 1919. Tha spring was exceptionally cold, development was consequently slow the females, when they did come out, were too chilled to begin feedin at once, so their eggs were laid, not in April but in June. Thus on brood was lost. The next brood was developing through the summe which in this year was unusually hot, and the drought, drying up th pools, destroyed it. Everyone in Bulgaria noticed in 1919 how fe mosquitoes there were and how few cases of malaria. Rain storm affect superpictus in the higher ground. As there are no forests, th rains at once flood the ravines, wash the larvæ out of their small poo

[1] Arch. f. Schiffs u. Tropen-Hygiene, xxv, 227.

and destroy them, and if these freshets are repeated within a month the next developing brood is wiped out. That is what happened in 1919. On April 25 came rain, so heavy that a bridge in the Struma Valley was washed away, and another rainstorm followed on May 7. Therefore in the superpictus area, too, there was little malaria that year."

As we now understand better, in the light of these observations, the natural history of the mosquito, it may be in some degree possible another time to forecast in June the extent of the epidemic that will come in the following summer. A cold spring delays development of all mosquitoes and lessens malaria. Heavy rains in spring decrease superpictus, but rains in summer increase maculipennis, decreasing, respectively, and increasing malaria in their districts.

Those who have followed surgical practice during the last 20 years have observed varying fashions in the methods of drainage, and even now there is no fixed rule of teaching. In the Lancet of October 29, 1921, Mr. F. D. Saner judiciously discussed the first principles involved in the treatment of acute suppuration and recalled the fact that drainage benefits largely by relieving tension. On the general question of drainage Mr. Saner suggested that the prominence given to several very attractive but accessory lines of treatment such as antiseptics, tissue solvents, serums, artificial hyperaemia, has tended to divert us from consideration of the main principles. All surgeons of wide clinical experience will agree that rest and relief of tension are the most important points to attend to in a case of spreading inflammation. In dealing with large serous cavities, such as the peritoneum and pleura, other factors intervene. The main principles must be fulfilled, yet opinions as to the technic of abdominal drainage still differ greatly. It is not so long since any patient suffering from spreading peritonitis would leave the theater with many rubber tubes projecting from the abdomen, like quills upon the fretful porcupine. This was the time when futile attempts were made to flush the peritoneal cavity free from infection by copious streams of saline solution.

Such methods, since they involved the neglect of the natural reparative processes of the peritoneum, were scientifically unsound and practically unsatisfactory. Later there arose the school which taught that the peritoneum could take care of itself in the presence of infection so long as the main part of the gross exudate was removed by operation; this assertion was backed by experimental proof, which showed that drainage tubes inserted into the abdominal cavity did not drain the main cavity for more than 12 to 24 hours owing to the formation of adhesions. Clinically it was found that the peritoneum could cause absorption of large masses of blood-clot

in cases of ruptured tubal gestation. L. S. Dudgeon and P. W. Sargent showed that such clot was frequently infected by staphylococci. Further it was shown that even gross contamination of the peritoneal cavity, as evidenced by turbid fluid or lymph or even pus, could sometimes be successfully absorbed without drainage. But the question of closing the abdomen in the presence of infection is still *sub judice*. Mr. Saner voices a common view when he regards it as largely a matter of judgment whether the abdomen should be closed and the patient asked to deal with the remainder of the inflammatory process. If tubes are inserted, he says, it must be on the understanding that their purpose is not drainage, but an attempt to create a temporary track or line of least resistance. Possibly it is too great an assumption that the insertion of a tube merely relieves tension. There are cases of peritonitis in which much fluid is secreted and few adhesions form. Following perforation of a gastric ulcer there is often such free drainage from a pelvic tube for several days that no one can believe the fluid to come merely from the track of the tube. Experiments upon the formation of adhesions made upon normal dogs need to be checked from the experience of disease and surgery upon human beings. Peritoneal exudates vary greatly in their lymph-forming powers; ascitic fluid and some forms of inflammatory exudate do not tend to form limiting adhesions so quickly, and will continue to drain through a tube for a longer period than the prescribed 48 hours.

In judging how and when to drain the abdomen one must therefore consider the intensity of the infection, and the fibrin-forming or clotting power of the exudate. Where there is much lymph, drainage is unlikely to be of benefit for more than a few hours; where the infection appears virulent and there are few adhesions it would be dangerous to close the abdomen entirely. It is likely that in the future the surgeon will be guided by the naked-eye estimate of the clotting process and a microscopical examination of the fluid to determine the resistance offered to bacterial invasion. D. P. D. Wilkie has shown that it is possible by a rapid microscopical examination of the peritoneal exudate performed in the theatre, to form an estimate of the resistance offered to infection, and thereby to judge the proper course to pursue. Such a proceeding might lead to a further advance in abdominal drainage, comparable to that achieved by a study of the mechanical factor of gravity which resulted in the adoption of the Fowler position. It is time for a collation of available experience. (LANCET, *November 19, 1921.*)

The appearance at the present moment of a book ("La Céruse," F. L. Cantineau, 1921; Paris et Liége: Librairie Polytechnique)

dealing with white lead is opportune, since the question is being keenly debated as to whether the use of this material in paints should be interdicted by civilized nations (The Lancet, Nov. 12, 1921, a Report of the International Labor Conference at Geneva). The author, who is frankly and wholeheartedly a prohibitionist, presents his case as an advocate rather than as a judge; moreover, when dealing with the clinical aspect of the case, he suffers from not being a medical man. But we find here a useful summary based for the most part upon Government inquiries and investigations carried out in many countries. All lead compounds, whether soluble or insoluble, are held to be poisonous; while of them, white lead—i. e., carbonate of lead—is considered to be the most poisonous and to claim most of its victims from among painters. Indeed, the number of deaths due to lead poisoning among painters is found to exceed that occurring in all other industries put together. Nor does the damage cease there, since lead absorption, even to a slight degree, predisposes the victims to other diseases. We regret to find the skin placed in the forefront as a portal of entry for lead, the digestive system placed second, with the inhalation of lead dust third, since Dr. T. M. Legge has incontestably demonstrated that the order should be exactly reversed. Similarly, the author is at fault in speaking not unfavorably of the so-called electrolytic treatment of plumbism, which appears to possess no value. Mr. Cantineau is at his best when pointing out the almost insurmountable difficulties attending efforts to protect painters while working, for example, in private houses, from risk of lead poisoning, so long as paints continue to contain lead. The question as to whether illness among painters arises from breathing the vapor of turpentine and whether such illness may not have been ascribed to lead poisoning (an opinion recently put forward in England by Sir Kenneth Goadby) is discussed by Mr. Cantineau at some length. Manufacturers of white lead, wishful to preserve their industry from destruction, have certainly attempted to make turpentine a scapegoat. The position is, however, difficult to accept when lead poisoning disappears while paints containing no lead, but turpentine as before, are employed. The painter may be exposed to two risks; is that a reason for not abolishing one? If turpentine is toxic, we can turn our attention either to finding a substitute or to rendering it nontoxic.

The second part of the book is an excellent historical account of the fight to abolish lead poisoning among painters. France has led the way, for there the campaign started at the end of the eighteenth century, was active throughout the nineteenth, and became acute at the commencement of the present century. It finally culminated in France in 1909 in a law prohibiting the use of white lead, linseed oil containing lead, or of any material containing white lead for

painting the inside or outside of buildings. A period of five years was given before the law should become operative, and the war intervened. The law was not enforced, and even now that the war has been over nearly three years, the difficulties of enforcing it have not been overcome. The difficulties arise from the fact that the manufacture of paint containing lead compounds is not abolished; such paints can still be used in the coach-building trade: meanwhile inspectors can not adequately control the use of such paints in private houses and other places. Clearly, if France intends to abolish the use of lead in paints employed on buildings, the law will have to be materially strengthened. No other country has yet proceeded so far. Regulations more or less stringent have been tried in Austria and in Germany, but they have failed to abolish the evil. The movement in Belgium, where regulations have also been tried, is discussed by Mr. Cantineau at some length, and the successful result of abolishing the use of lead paints on the State railways is quoted. The case with regard to Great Britain, where up to the present no action has been taken, is presented by relating the findings of the committees appointed to consider the matter; indeed, throughout this book the evidence presented to, and the conclusions arrived at, by these important committees are frequently quoted at length.

The remedy recommended is considered in the last part of the book. Here the conclusions of the author, who is an engineer, are of particular value. He maintains that substitutes such as zinc white and lithophone have been proved the equal, if not superiors, of white lead, and that supposed difficulties in their use are entirely imaginary. He shows, by quoting market prices, that both these materials to-day cost less than white lead. The sources of supply are looked into and declared to be adequate, so that increased demand should not inflate prices, but rather, by calling more manufacturers into the field, tend to lower them. "If to-day white lead were suppressed," he asserts that "our houses would be painted as well as they are now and that we should not suffer in any way, and that very probably after a period of 20 years we should almost have forgotten the very existence of white lead." (LANCET, *November 19, 1921.*

In a relatively unknown little book on the Shetland Islands, written by Dr. Robert Cowie and published in 1871, a method of preventive inoculation for smallpox is described that is of considerable interest from the historical point of view. Variola appears to have wrought much havoc among the Shetland Islanders during the eighteenth century. In 1720 the disease was so fatal as to be termed the "mortal pox." The disease was very fatal in 1760 also. Inocula-

ion was introduced, but owing to the high fee (2 or 3 guineas) of the perator only 10 or 12 persons availed themselves of it. The malady eappeared in 1769, and recourse was had more generally to inocu- ation; practiced according to the usual method it appears to have een followed by the usual results, namely, diminution of the mor- ality, but spread of the disease. The author continues: "The ortality continuing very great, a common, uneducated, but very ble peasant named John Williamson invented an improved method f inoculation which, had it not been superseded by the more valu- ble discovery of vaccination (1796), I venture to say would have roved one of the most valuable discoveries in modern medicine. Villiamson's method is thus described in 1792 by his contemporary, he Rev. Mr. Dishington. He is careful in providing the best matter, nd keeps it a long time before he puts it to use—sometimes 7 or 8 ears; and in order to lessen its virulence, he first dries it in peat moke and then puts it underground covered with camphor. Though any physicians recommend fresh matter, this self-taught prac- tioner finds from experience that it always proves milder to the atient when it has lost a considerable degree of its strength. He ses no lancet in performing the operation, but by a small knife ade with his own hands he gently raises a very little of the outer kin of the arm so that no blood flows, then puts in a very small uantity of matter, which he immediately covers with the skin that ad been thus raised. The only plaster that he uses for healing the ound is a bit of cabbage leaf. It is particularly remarkable that here is not a single instance in his practice where the infection has ot taken place and made its appearance at the usual time. He ad- inisters no medicine during the course of the disease, nor does he se any previous preparation. Mr. Dishington also informs us at several thousands have been inoculated by Williamson, and e has not lost a single patient." The principles here employed of illing off contaminating bacteria by peat smoke and camphor, and f attenuating the virus through age, are of considerable historic nterest. Dr. Cowie, writing almost a century later, suggests that ossibly the same principle could be applied to the viruses of scarlet ever and measles for prophylactic purposes; but, so far as we are ware, bacteriology even to-day has not advanced thus far, though ossibly the experiments by Kusama as to typhus fever, and Taka- ashi as to scarlet fever may indicate a move in this direction. (British Medical Journal, *November 26, 1921.*)

The Journal of the American Society of Heating and Ventilating ngineers for January, 1922, contains a paper on "Hospital ship

ventilation," by R. C. Holcomb, commander, Medical Corps, United States Navy.

The American Journal of Tropical Medicine for January, 1922, contains three interesting papers written by naval medical officers:

"Public health problems of the southern countries," by Commander N. T. McLean, Medical Corps, United States Navy.

"A review of the reorganization of the sanitary and public health work in the Dominican Republic under the United States Military Government of Santo Domingo," by Commander Reynolds Hayden, Medical Corps, United States Navy.

"The Medical Department in the Virgin Islands," by Commander O. J. Mink, Medical Corps, United States Navy.

NURSE CORPS.

WHAT NURSES NEED TO KNOW ABOUT FOOD AND DIETETICS.

Time, which mellows all memories, is making the horror of the World War less acute, and the majority of the actively employed are consciously and subconsciously recognizing conditions which may be said to have been improved by the upheaval of the great calamity. It would seem to be wise to dwell on this aspect of present conditions, while basing such recognition on the determination that continued development and improvement shall not, in the future, require the instrument of war.

The women of the nations have met the near past and present hardships and problems with fortitude and with amazing evidences of mental and physical strength. This fact has been almost universally recognized; and one may even add that the aptitude shown by them in meeting situations was disconcerting to the relatively large number who had not followed the development of women in their relation to public life.

With the return of men from the war to their former occupations, women have been required again to adjust themselves, and they have surrendered many activities which they controlled during the war period. There are, however, certain fields of useful work for which women are particularly fitted and these activities will remain their specialties without the keen competition from men which will be met in other professions and occupations. Of these activities, the nurse, the dietitian, and the teacher form a group which is preeminently important in the development of our citizens. The contact in these callings has always been close; but war has welded them, and together they are the great force for physical and mental well-being in the battle of life.

It is, indeed, difficult to define "What nurses *need* to know about food and dietetics." The vision realized would see the nurse and dietitian coordinating in all hospital, public health, and welfare activities; recognized as necessary parts of the civic life; and supplementing the work of that other necessary expert, the teacher. The vision also gives to these three forces for good citizenship the wage commensurate with the importance of their vocations. The vision or dream is far from realization. At present the work of the nurse, except in her hospital sphere, takes her into many activities where

the dietitian is not her coworker, and while this condition continues to exist it is essential that the knowledge of food and dietetics should be a definite part of her training school education. So clearly is the need recognized, that other subjects now considered essential in the curriculum of the training school will be sacrificed to the broader knowledge of this fundamental subject. This is better understood when we explain that the term "dietetics" is used as representing the effect of the food on the human body.

The nurse is the assistant of the doctor. The knowledge of dietetics of the surgeon and practitioner is on broad general lines. The nurse is expected to have the detailed knowledge which will enable her to apply his general suggestions to the individual case. Not long ago, the case of gastric ulcer or of chronic nephritis meant a case, in general terms, to the nurse. To-day the nurse who cares for such a patient must have a definite knowledge of the problems to be considered in arranging the diet. She must be able herself to utilize and to direct others in the utilization of food materials in such a manner that the impaired body may gain the greatest value from the nourishment which should be given, and she must consider this gain in connection with as small an expenditure of vital forces as is possible.

Briefly, one may review the various branches of the nurse's work and whether she follow private duty or industrial nursing, school work, or visiting work; in each and every field the greater service she will render is in proportion to the extent of her practical knowledge of food and dietetics acquired during her training or supplemented by additional courses after graduation. The place of the dietitian instructor on the staff of the training school can not be too strongly stressed. She it is who opens the door and gives to each pupil the conception of the need for this knowledge. It would seem that the limit of this instruction to the pupil should be fixed only by the time which can be alloted to the subject; and the limit after graduation is fixed by the nurse and her necessities.

The whole subject is so extensive and important that limitation is difficult and undesirable. In preparing a curriculum for student nurses, physiology, anatomy, bacteriology, and dietetics are fundamental and are interwoven in the applied knowledge of their calling. Certain phases of instruction in dietetics, however, have been found of greater practical benefit to the nurse than others. A general knowledge of the composition and classification of foods, chemistry, and physiology of digestion, absorption, assimilation, and elimination is essential. Of paramount importance to the nurse is careful instruction in the various methods of feeding the sick; preparation of menus, including convalescent soft and liquid diets; service of food; the essentials of diet in disease, such as diets for diabetic and nephritic cases, anemia, cardiac diseases, tuberculosis, etc. For

nurses who intend to enter the field of public health and welfare work, this general knowledge should be supplemented with that of selection and care of food; knowledge of fuel value of food for economic construction, and substitution of food; while the subject of the feeding of children should receive special attention in the instruction of nurses who intend to enter this field of work.

The function of medicine is to educate, and the chief aim of physicians, nurses, dietitians, and teachers should be one and the same, namely, to inculcate right principles of thinking and doing, which can be accomplished only by acquiring and maintaining physical soundness. Instruction in a course which will add to the efficiency of the nurse and render her more useful in her mission of restoration of health should not be limited by "need" but should be encouraged to continued effort and progress.

DIGEST OF DECISIONS.

DISABILITY IN THE LINE OF DUTY.

McN-C'a

26251-23422 : 3

DEPARTMENT OF THE NAVY,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, 14 December, 1921.

From: The Judge Advocate General.
To: The Chief of the Bureau of Navigation.
Subject: Sundstrom, Talbot Thorwald, seaman, U. S. Navy, re line of duty.
Reference: Report of Board of Medical Survey, September 27, 1921, in the case of the above-named man and indorsements thereon.

1. It appears from facts presented in reference that the disability complained of in the case of the above-named man was incurred while he was serving a sentence in the naval prison, Portsmouth, N. H. There are, however, no facts presented to show either that the disease was in any wise due to his own misconduct or that it was connected with the sentence imposed.

2. This man, having absented himself from the service for several months without leave, was apprehended, tried by general court-martial for desertion, and sentenced to serve two years in prison at hard labor and to receive a dishonorable discharge from the naval service. This sentence was reduced to 18 months and the naval prison at Portsmouth, N. H., was designated as the place of confinement. A board of medical survey convened at that place September 27, 1921, found the above-named man to be suffering from tuberculosis, chronic pulmonary, origin not in line of duty, not the result of his own misconduct, and recommended that he be released from confinement and discharged from the naval service, which discharge was directed October 15, 1921.

3. The question presented is whether the findings of "Not in line of duty" is a correct finding under the circumstances of this case. From a careful consideration of the decisions of the department and opinions of the Attorney General upon this question it would seem that it was not. In the case of George L. Morgan, apprentice seaman, decided by the department January 28, 1909 (file No. 26543-20), it was held "that Morgan was at the time of his death on the active list of the Navy, and that death resulted from wounds or disease contracted in the line of duty, within the meaning of the act of May 13, 1908." From a careful examination of the provisions of the act of May 13, 1908, it is noted that the line of duty therein provided for is the same as that found in other statutes relating to the Navy. In addition to the above the facts in this case were as follows: On the date of his death, October 6, 1908, Morgan was a general court-martial prisoner sentenced to confinement for nine months with corresponding loss of pay, police duties, and dishonorable discharge. His period of enlistment had not expired and he was performing duty assigned him at the time the accident occurred resulting in his death.

In reply to a request of the Surgeon General of the Navy for an opinion on the following point—

"If a prisoner is injured while working in the prison or around the yard, is his injury to be regarded as in 'line of duty'?"—

the Secretary of the Navy, April 7, 1909 (File No. 26285–30), held—

"That work done by them [prisoners] in the prison or about the yard is performed in obedience to orders and in the execution of a military discipline, and that injury to a prisoner resulting from obedience to such orders is regarded by the department as in line of duty as it would be in the case of other enlisted men, not prisoners, injured in the execution of orders. The approval of a sentence of a court-martial does not impose any forfeiture not expressly stated in the sentence or which may by statute result from a conviction."

The foregoing decisions of the department have not been universally followed, due, no doubt, to an erroneous interpretation thereof contained in Naval Digest, 1916, page 342, title 80.

5. It is clearly understood that a man in the naval service though a prisoner serving a sentence as the result of a legal conviction by a proper naval tribunal may so conduct himself in the performance of duty that a disability contracted as a result thereof must be held to have been contracted in the line of duty. Attorney General Cushing in his opinion of May 17, 1855 (7 Op. Atty. Gen., 149), commented upon this proposition as follows:

"A soldier or sailor, while 'under arrest,' or 'in confinement,' is not discharged from the obligation of duty, and is occasionally called upon to perform duty in which he may distinguish himself, and die honorably * * * as, for example, in the contingency of a post or a camp attacked by the enemy, or a ship in peril at sea. * * * So it may be in the case of a soldier temporarily 'absent on leave,' nay, even of one compromised in some grave military offense. For, when violation of duty is taken as a rule of exclusion, it operates, in my opinion, only where the violation of duty *has probably relation to the cause* of death; and not where these are independent facts. Thus, a sailor, who is laboring under all the worst effects of vicious indulgence, and subject to die at any moment of disease occasioned by that cause, may yet happen to die of other disease contracted, or of casualty occurring, or of injury received, while indubitably in the line of his duty. * * * In a word, these assumed causes of exclusion should operate not per se, but only where they *affirmatively* exclude the line of duty" (p. 154).

"He who contracts disease or dies in consequence of the ordinary performance of his military duty, or in the performance of any special act of military duty, whether at the moment of performance he were on duty or off duty, in active service or on furlough, of habits virtuous or habits vicious, gallantly fighting his country's enemy *or expiating an offense in the guardhouse or prison bay*—he, I say, who, in these or any other circumstances, contracts disease in the performance of an act of duty, contracts it 'in the line of duty'" (p. 161).

"Every person who enters the military service of the country—officer, soldier, sailor, or marine—takes upon himself certain moral and legal engagements of duty, which constitute his official or professional obligations. While in the performance of those things which the law required of him as military duty, he is in the line of his duty" (p. 162).

"When it is remembered that no commissioned officer, or enlisted soldier, seaman, or marine, has power to cast off his obligation at will—that whether he be on duty or off, in glory as in disgrace, still the banner of his country

is over him and its oath upon his conscience—when this great fact shall be remembered it must be inevitable to concede that any rule, based on the assumption of its being impossible for an officer or soldier on furlough, on leave of absence, in arrest, *under sentence*, to perform acts, suffer casualties, receive wounds, or incur causes of disease, in the line of duty, is not a truth, and, like all things not true, can not be conformable to justice or wisdom. As, while on active duty, he may do or suffer things not in the line of his duty, so whilst off duty, or on furlough, or *under censure*, he may do and suffer things which are in the line of duty" (p. 163).

6. The foregoing extracts from said opinion of the Attorney General appear to be unanswerable and limit a court-martial sentence to a forfeiture only of those things expressly stated therein or which may by statute result therefrom. In view of the foregoing, this office is of the opinion that under said opinion of the Attorney General prisoners occupy the same status, as regards line of duty, as other members of the naval service, except in those cases where the disability suffered by a prisoner is per se a part of the sentence adjudged by the court. For example, if a man is sentenced to suffer death and is executed, his death can not be said to have originated in the line of duty. On the other hand, where a prisoner incurs a disability in the performance of a duty which he is required to perform by those in command over him, said disability should be held to have originated in the line of duty.

7. For many years said opinion of the Attorney General was interpreted as restricting line of duty to those cases where the disability complained of was directly traceable to an act of duty, but in a recent opinion, August 21, 1919 (32 Op. Atty. Gen., 12), reaffirmed June 2, 1920 (32 Op. Atty. Gen., 193), line of duty was given a more liberal application as follows:

"The mere fact that an injury or disease is coincident in time with service is not sufficient to class it as suffered or contracted 'in the line of duty.' It must have been caused by the presence of its victim in the line of duty when it was received or contracted. But the relation of causation is sufficiently shown when it appears that the victim *was at a place* and doing what was required or permitted by his duty as a soldier, and that, between his presence and conduct and the injury or disease, no adequate and sufficient cause, for which he is responsible, intervened.

"While in the active service and submitting to its rules and regulations he (soldier, sailor, or marine) is, in general, in the line of duty, and an injury suffered or disease contracted under these circumstances is suffered or contracted in the line of duty, unless it is actually caused by something for which he is responsible which intervenes between his service or performance of duty and the injury or disease. He will be responsible for any intervening cause if (1) it consists of his own willful misconduct or (2) it is something which he is doing in pursuance of some private avocation or business."

8. The foregoing opinions have been interpreted by the department in a number of cases as being applicable where the disability complained of arose while the individual was in the naval service without requiring that it be directly traceable to an act of duty.

9. The Attorney General, however, further held in said opinion on August 21, 1919, that—

"When confined under sentence one becomes a prisoner, and, for the time being, ceases to be a soldier employed in the active service."

He concludes from the foregoing that when an individual is confined under sentence of a general court-martial he is not entitled to a holding of line of

duty for a disability incurred while a prisoner. The statement that "When confined under sentence one becomes a prisoner, and, for the time being, ceases to be a soldier employed in the active service," is not true in fact and is, as Attorney General Cushing very aptly said, "Like all things not true, can not be conformable to justice or wisdom." (7 Op. Atty. Gen., 164.) It required no brief to point out to those familiar with the administration of naval court-martial prisoners that, prior to their discharge from the service either by expiration of enlistment or otherwise, they continue members of the naval service subject to orders to the same degree as members of said service not prisoners. For these reasons it appears obvious that so much of said opinion of the Attoney General as relates to status of members of the naval service undergoing sentence of court-martial is in error and can not be accepted by this department as controlling its findings upon whether or not a disability incurred by a member of the naval service undergoing sentence of a court-martial had its origin in the line of duty.

10. It is further noted that the Attorney General in his opinion of August 21, 1919, places court-martial prisoners in the same status as individuals in a hospital or otherwise relieved from active duty by command of his superior officers because of disease or injury contracted or suffered as the result of his own misconduct. This office has held and the department has decided that an individual in a hospital or relieved from active duty by the command of his superior officer on account of disease or injury contracted or suffered as the result of his own misconduct is in the line of duty for any disability contracted or injury received by virtue of an order of his superior officer while in that status. (Apr. 29, 1918, File No. 26543–213; Oct. 10, 1921, File No. 29372–13.)

11. This office concurs in so much of the Attorney General's opinion as holds that the status of naval court-martial prisoners while undergoing sentence prior to the expiration of their enlistment is similar to individuals in the naval service suffering from disease or injury contracted or suffered as the result of their own misconduct, but is further of the opinion that in the event of a subsequent injury or disability contracted due to orders received while undergoing sentence, said disease or injury must be held to have had its origin in the line of duty. This opinion is clearly supported by the opinion of Attorney General Cushing, above noted, and for the further reason that to hold otherwise would be to require members of the naval service undergoing sentence of a court-martial to forfeit a right granted them under the law which is neither excluded by the sentence nor by the statutes applicable to said sentence.

12. To determine in a given case whether or not a disease, such as tuberculosis, has been contracted as the result of the performance of duty is apparently beyond the realm of possibility, but under the recent opinions of the Attorney General and the decisions of the court (Moore *v.* United States) it has been held by this department that in all cases where it can not be shown that the disability complained of was contracted as the result of his own misconduct the claimant is given the benefit of the doubt, and it is held that it was in fact contracted in the line of duty. For example, where a man in the naval service is found to be suffering from a disease, such as tuberculosis, and it can not be shown that he had it prior to his admission into the naval service, or that it was due to his own misconduct, the findings is universally line of duty, i. e., due to the service. (Sept. 13, 1921, File No. 29372–3.)

13. In the case under consideration the disability complained of can not in any way be connected or associated with the execution of the sentence, nor are there any facts to support a conclusion that it is due to his own misconduct.

plying to this case the rule that where a man in the naval service is found be suffering from a disease such as tuberculosis, and it can not be shown that had it prior to his admission into the naval service or that it was due to his n misconduct the finding must be line of duty and from a careful examina- n of the facts presented, this office is of the opinion that the finding of "Not the line of duty" should be changed to "In the line of duty," and you are vised accordingly.

J. L. LATIMER.

Approved, 14 December, 1921.

EDWIN DENBY,
Secretary of the Navy.

92484—22——8

BOOK NOTICES.

Publishers submitting books for reviews are requested to address hem as follows:

The Editor,
U. S. Naval Medical Bulletin.
Bureau of Medicine and Surgery, Navy Department.
Washington, D. C.
(For review.)

Books received for review will be returned in the absence of directions to he contrary.

REVIEWER.

Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.

"The books upon a man's shelves are a counterpart of the man vho possesses them."

'APERS FROM THE MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH AND THE MEDICAL SCHOOL OF THE UNIVERSITY OF MINNESOTA, 1915–1920. Volume 1. W. B. Saunders Company, Philadelphia, Pa., 1921.

This is the first volume of a series of papers which for the most part were "originally in the form of theses presented by graduate medical students in the Mayo Foundation and the medical school of he University of Minnesota in partial fulfillment of the requirements for the degree of master of science or doctor of philosophy in various preclinical as well as clinical fields." The papers cover a vide range of subjects. (W. M. K.)

'ROSTITUTION IN THE UNITED STATES, by *Howard B. Woolston, Ph.* The Century Company, New York, 1921, and

'ICE AND HEALTH, PROBLEMS-SOLUTIONS. by *J. C. Funk, M.A., LL.B., Director, Bureau of Protective Social Measures, Pennsylvania State Health Department.* J. B. Lippincott Co., Philadelphia, Pa., 1921.

As the health and morals of any community depend upon the enlightenment and intelligence of its voters these two books which set orth facts necessary to a successful handling of vice problems have been prepared by writers who have devoted much study to the question. They present in compact, nontechnical form a discussion of he social economic, moral, legal, and health problems involved in he suppression of vice, the safeguarding of youth and the protection of the public health. (W. M. K.)

Massage and Medical Gymnastics, by *Dr. E. A. S. Kleen*. Translated from the Swedish language by *Mina L. Dobbie, M. D., B. Ch.* Second edition. William Wood & Co., New York. 1921.

Massage and physical exercises have formed a branch of medical and surgical treatment from time immemorial and have been used in all countries, but nowhere has the art reached greater perfection than in Sweden. Dr. E. A. S. Kleen has spent a lifetime in the study and practice of this specialty, and he has written a book which may be considered unique and which should be welcomed by everyone interested in this form of treatment.

Since the war the practice of physiotherapy has gained deserved recognition by the medical profession at large and the treatment of late results of war wounds and injuries has aroused an interest in orthopedic surgery that is unprecedented. The surgeon has begun to think in terms of "function." He is no longer satisfied with a successfully performed operation per se, but he is endeavoring to restore the part operated upon as near as possible to its full normal functional activity. In this restoration massage and physical exercises must necessarily take a leading part.

The reviewer knows of no book in the English language which offers such a fund of information concerning a specialty which the general practitioner up to the present time has left to a great extent in the hands of the masseur.

In his introduction the writer reviews the history of this branch of therapeutics and explains its need in modern medical practice.

In order to make his book as comprehensive as possible, Dr. Kleen invited certain specialists to contribute chapters on the subjects of which they possessed special knowledge and these special chapters make up one-third of the volume. The first three chapters are devoted to a discussion of the meaning of massage and its technic, therapeutic effects, and contraindications, and in the three succeeding chapters the writer takes up, in like manner, the question of medical gymnastics.

Chapter 9 is devoted to a discussion of the technic of Ling's system of Swedish (manual) medical gymnastics and the effect of special exercises. This chapter was written by Dr. J. Arvedson, a gymnastic director well known in Sweden.

Chapter 10, on the methods of medicomechanical gymnastics, was prepared by Dr. Emil Zander. Ling employed trained medical gymnasts to carry out the movements required by his manual method. The medicomechanical method founded by Dr. Gustaf Zander, so far as possible, while following the same principles underlying all medical gymnastics, endeavors to replace the gymnast by apparatus of a mechanical nature.

Dr. Patrik Hoglund has contributed an illuminating chapter on he use of medical gymnastics and massage in orthopedic practice, nd in the remaining chapters Dr. Kleen points out the benefits to e derived from the use of massage and gymnastics in the treatment f various diseases which are often intractible under the ordinary ethods of treatment. (W. M. K.)

LINICAL SURGICAL DIAGNOSIS, by *F. de Quervain, professor of surgery and director of surgical clinic at the University of Berne.* Third English edition. Translated from the seventh edition by J. Snowman, M. D. William Wood & Co., New York, 1921.

"This book," says the author in his preface, "is the outcome of ears of association with students as a teacher and with medical ractitioners in consultation. It is intended to serve as a guide to he former in the vast field of surgical diagnosis which they are equired to explore, and to recall to the latter knowledge which has erhaps faded, while drawing their attention to new developments n diagnosis."

Prof. de Quervain was for many years the first assistant to Theo- ore Kocher, and he has now succeeded to the chair of surgery which as adorned for so long by that eminent Swiss surgeon, and the ook, to a great extent, reflects Kocher's teaching. This fact alone ould recommend it highly to the medical profession.

The book covers the entire range of civil surgery, and the new evelopments in surgical diagnosis, which were an outgrowth of the ar, are accorded ample recognition. Throughout the volume, in is discussions of the various surgical conditions, Prof. de Quervain as employed those methods of diagnosis which nowadays are eadily available to the general practitioner, and he has adhered to is plan, which has made his teaching so effective, of starting each iscussion with a consideration of the symptoms which caused the atient to seek medical advice, and not to the method found in so any textbooks, of deducing symptoms from a diagnosis already ade.

The work is divided into seven parts, which treat in a compre- ensive manner the diagnosis of the surgical diseases and injuries of ie head, of the neck, of the thorax, of the abdominal and pelvic iscera, of the pelvis and spinal column, of the upper extremity and f the lower extremity. A useful feature of the book are the short se histories which the author uses to illuminate nearly every con- ition treated.

The illustrations are original and for the most part are photo- raphic reproductions of conditions encountered in the author's clinic Berne. (W. M. K.)

Clinical Diagnosis by *Charles Phillips Emerson, A. B., M. D., professor of medicine, Indiana University School of Medicine.* Fifth Edition. J. B. Lippincott Co., Philadelphia, Pa., 1921.

Ten years have passed since the last edition of this book appeared, a period of time in which so much new material has become known that, in producing a new edition, the author found it necessary to completely rewrite the entire volume. In this edition several new sections are found, among them those on serology, bacteriology, chemistry of the blood and of the spinal fluid. The book is based on years of experience in teaching, first as a physician in charge of the clinical laboratory and instructor in medicine at Johns Hopkins Hospital and University, and later as a professor in the University of Indiana, and in its production, as the author tells us, no attempt has been made to describe methods as yet untried, only those being recorded which the author or his associates have personally found valuable.

The introduction to the work was written by Dr. William Osler in 1906, when Dr. Emerson was at Johns Hopkins. In it he says: "This book is the outcome of the work of Dr. Emerson and his students during the past five years. Not only does it represent the results of a very large number of careful observations made in the laboratory, but an analysis of many important groups of cases in the wards, so that it illustrates the experience of the medical clinics of this hospital [Johns Hopkins] so far as it relates to microscopical and chemical methods of diagnosis. The work will be found a comprehensive and trustworthy guide in all the details of laboratory work."

The book is made up of seven chapters which deal with the sputum, the urine, the stomach contents, the intestinal contents and feces, the blood, the cerebrospinal fluid, and the examination of various body fluids.

The author deplores the fact that "the examination of the sputum is fast becoming a lost art." As he points out, there is a lot more to it than the mere search for the tubercle bacillus and the typing of pneumococci.

About one-third of the book, which contains over 700 pages, is devoted to a consideration of the urine. In this section, the author discusses, among other things, the nitrogenous bodies found in the urine, the inorganic acids and bases, pigments, ferments, carbohydrates and allied bodies, acidosis, uremia, and diabetes, the proteids and sediments, the bacteriology and parasitology of the urine, functional renal diagnosis, and the diseases of the kidneys. The various tests which are employed in connection with these subjects are plainly described and commented upon.

In the chapter on the stomach contents, a description of the fractional determination of gastric secretion recently devised by Rehfuss

ill be found. The description of the intestinal parasites is complete and this section of the chapter on the intestinal contents and ıe feces is admirably illustrated.

The chapter on the blood comprises another third of the volume. ll the practical methods of blood examination are described as well ; the pathological conditions encountered. This section is espeally well illustrated by means of colored plates which show the ood changes in various diseases. Blood chemistry, blood bacriology, agglutination phenomena, complement fixation, and isoemagglutinins are fully discussed. The chapter is concluded by a nsideration of the blood as it is affected by various diseases.

A study of the cerebrospinal fluid and a discussion of the examinaon of various fluids such as transudates and exudates, the cystic uids, the synovial and amniotic fluids completes the volume.

This is one of the most useful textbooks on clinical diagnosis in ıe English language and the new edition will, without a doubt, tain the popularity enjoyed by the former editions. (W. M. K.)

Fortnight in Naples by *André Maurel*. G. P. Putnam's Sons, New York, 1921.

Monsieur André Maurel is a lover of Italy who has spent the reater part of his life wandering up and down the peninsula peepg into interesting places and recording his impressions of their storical and artistic aspects. Some of these impressions have apeared in two delightful volumes entitled "Little Cities in Italy," hers are to be found in "A Month in Rome," all published by . P. Putnam's Sons, of New York, who have recently announced ıe issue of Maurel's latest book, A Fortnight in Naples, translated y Helen Gerard.

A naval officer's impressions of Naples are generally derived from me official calls, some afternoon teas, the meals he has eaten in ıe brightly lighted Restaurant Gambrinus, a cursory inspection of ıe marvels of the aquarium and the treasures of the museum, a opping expedition to the arcade and along the Via Roma, a swift to trip to Pompeii or to the ruins of Cumae, an ascent to the eights behind the city which afford a never-to-be-forgotten view f the Bay of Naples and the curving shore line studded with vilges of dramatic name, and made green by numerous vineyards—scene flooded by bright sunlight which penetrates to the lowliest lleys of the city below.

The visitor to Naples looks upon a beautiful scene, but in it he nds misery and filth, for Naples is an old city and crowded. As ıe tourist watches the multitudes in the narrow streets, in the ublic squares, or about the Porta Capuana, he may wonder from hat larvæ of the past they come. André Maurel will tell him if

he really wants to know. In A Fortnight in Naples he takes his reader about the city, not after the fashion of the professional guide, but rather of the teacher of history who is able to produce tableaux of the various epochs which make up the history of the city and cause them to pass in review while pointing out to the reader what remains as souvenirs of each period of the city's past.

Naples was once a Greek city perched on the crown of a hill, Parthenope by name. In the course of years it outgrew the heights of Pizzofalcone, or wherever it was located, and a new city, Neapolis, was built, Parthenope becoming merely the "old city," Palæopolis. Just where the Palæopolis of Parthenope stood, or on what ground lay the new city, Neapolis, are disputed questions to this day. All that is left of Greek Naples are two Corinthian columns in the middle of the façade at the top of the steps of the Church of San Paolo—remains of the old Temple of Castor and Pollux.

Rome was not slow to cast eyes on this pleasing land, and the coast about Naples became sprinkled with Roman villas and towns. On the fall of the Roman Empire, Naples created for herself an independent existence, and toward the beginning of the eighth century became a recognized duchy. Then the Lombards came, camping at the gates of the city; and in time some of those Normans who had appeared in southern Italy and whose leader had become allied to the Duke of Naples by marriage, were called to aid her in maintaining her liberty. Other Normans came—those of the great Hauteville family, and the Lombards departed. But the Normans remained.

And Monsieur André Maurel comments on what is left of this Angevin occupation, of the Aragonese which followed it, and of the Naples under the Bourbons. He takes his reader on a journey along the "Lover's Coast" to Salerno and Amalfi, to Vesuvius and Pompeii, and over to "The Happy Isle" of Capri and across the burning Phlegræan Fields to the west of Naples where lie Pazzuoli with its souvenirs of Rome, and Baia, where Lucullus once owned a villa, and the ruins of Cumae, the most ancient of Greek colonial cities.

Instead of walking about anywhere and everywhere and merely telling what is to be seen, Maurel arranges his strolling into 14 historical periods, one for each day of the traveler's visit, and that is the only way to treat Naples if one is to understand the things he sees.

If one is so fortunate as to possess the two volumes of Norway's Naples Past and Present, published in 1901 by the Frederick A. Stokes Co., of New York, but now entirely out of print, André Maurel's A Fortnight in Naples should find a place on his bookshelf alongside of them, as it contains more of the real spirit of Naples than any other book, except, perhaps, Matilde Serao's novel, The Land of Cocagne, which Maurel mentions. (W. M. K.)

QUERIES.

Medical officers are invited to submit queries and to present their problems to the BULLETIN, *which, being in a position to draw on varied and extensive sources of information such as are not available elsewhere, will use every means of securing authoritative opinion.*

All queries will be answered by mail; and the replies, if of sufficient general interest, will also be published in this column.

To the Editor: I desire to secure the loan of certain medical books of recent issue for use in the preparation of an article for the BULLETIN. I am attached to a small cruising ship which has the usual medical library furnished to vessels by the Bureau of Medicine and Surgery, but these volumes do not throw any light upon the subject in which I am interested. Can medical officers at sea secure books from the library of the United States Naval Medical School; and if so, what procedure is necessary? SCRIPTIONALIS.

Your desire to use additional books in connection with your literary efforts is highly commendable. The Bureau of Medicine and Surgery desires to provide all medical officers with ample facilities for ready reference to the latest medical literature, and from time to time it has given attention to plans submitted for extending library facilities to medical officers afloat, but none of the plans so far advanced has been feasible. There are several ways by which you may secure the use of reference books for a limited time.

Possibly you have overlooked paragraph 3220 on page 232 of the Manual for the Medical Department, United States Navy, which is as follows:

> Applications from medical officers of ships and stations for the loan of books and duplicate copies of current periodicals in the school library should be addressed to the medical officer in command. It is the intent to have the library of the school utilized by medical officers generally so far as may be practicable, but receipts will be required, and officers securing publications will be held responsible for their prompt return.

Each naval hospital has been authorized by the bureau to lend books and periodicals to medical officers not attached to the hospital under such regulations as the commanding officer may institute.

Each hospital ship is expected to extend library privileges to officers in the fleet with which it is serving.

Certain fleet surgeons have assembled libraries on the flagship for the use of medical officers in the fleet.

In all the large ports there are medical libraries belonging to societies and institutions, the officials of which have been very generous and courteous in extending the privileges of the libraries to naval medical officers.

Of course it seems needless to remark that any book you may borrow from any of the above sources must be returned promptly and in good condition, and it is only the fear that books may be lost or damaged in transit that would cause a librarian to look with disfavor upon a request for the loan of books.

The medical officer at sea really does have many library facilities, but it is surprising how little advantage is taken of them. In spite of the paragraph in the Manual for Medical Officers mentioned above the Naval Medical School Library has not received a single request from a medical officer serving at sea for the loan of books in the past three years. The commanding officer of the U. S. S. *Solace* did not receive a request for books or periodicals in a three-year period investigated, although the vessel's library privileges were extended repeatedly to the medical officers of the fleet assembled at the fleet surgeon's conferences. During an eight-month period only on a few occasions were books borrowed from the libraries of the U. S. S. *Mercy* and the U. S. S. *Comfort*, although all the medical officers of the fleet were on board at least once a week, and the library privileges were advertised.

To the Editor: I would like the names of a few good books or special articles on hydrotherapy.

Cos Asclepieion.

Hydrotherapy, by Simon Baruch, published by William Wood & Co.; Rational Hydrotherapy, by J. H. Kellogg, published by the Good Health Publishing Co., of Battle Creek, Mich.; and Hydrotherapy for Students and Practitioners, by George K. Abbott, are highly recommended. In the Oxford System of Medicine there is an excellent section on "Hydrotherapy," written by Guy Hinsdale, M. D., the associate professor of climatology in the University of Pennsylvania.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieutenant Commander R. F. JONES, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

SANITARY SURVEY OF SHORE STATIONS AND ITS PRACTICAL APPLICATION.

When a medical officer is assigned to duty as senior medical officer of a shore station, it becomes his duty to act as the health officer as well as to direct the general medical activities of the station. One of the first duties of the reporting senior medical officer is to inspect and receipt for all the medical property on the station. In this way he becomes at once familiar with the medical material of the station. The importance of this has been long recognized, as it protects both of the medical officers and the Government, and at the same time gives the new medical officer from the beginning a thorough familiarity with the material with which he has to work. It is equally as important for the reporting officer to have as soon as possible a concise outline of the sanitary and public health conditions of the station where he is to administer these activities. For this purpose nothing meets the requirements better than a complete sanitary survey. Public health workers to-day recognize that it is impossible to operate a department of health successfully without a concise knowledge of local public health conditions as they actually exist. No up-to-date health officer would assume to direct the health activities of a community without first making an exhaustive sanitary survey. With the information thus gained he is in a position to evaluate the public health needs of the community, and is also in a position to intelligently direct his future activities. In the past, as a result of unfamiliarity with the actual existing conditions, the activities of many health departments were unbalanced. Stock taking is just as essential in public health work as in business.

An outline for making a sanitary survey, similar to those used by modern public-health officers, but adapted especially for the needs

of the Navy, is presented, herewith, as an aid to medical officers who are charged with the duties of directing the public-health work of shore stations. This outline is designed for shore stations in general and should be modified to meet local requirements.

OUTLINE FOR SANITARY SURVEY OF SHORE STATIONS.

1. *Geographical position, topography, geology, climate, and type of station.*

2. *Character of naval and civilian personnel, and of adjacent population.*

3. *Local public health laws and practices.*

4. *Organization of the sanitation and public-health division of the Medical Department, including laboratory facilities.*

5. *Water supply.*

(*a*) Source—lake, river, wells, springs, etc.

(*b*) Adequacy of supply.

(*c*) Method of collection.

(*d*) Possibilities of contamination at the source, on the shed, and in transit.

(*e*) Methods of purification.

(*f*) Storage and distribution.

(*g*) Does a dual water supply exist? Connections, etc.

(*h*) Chemical and bacteriological analyses of water.

(*i*) Swimming pools, care of.

6. *Sewage.*

(*a*) System of disposal—if treated, how? Efficiency.

(*b*) Outlet—into salt or fresh water and whether below low tide.

(*c*) Is any water supply endangered?

(*d*) Privies, cesspools, septic tanks—how operated? Proximity to wells or other water supply.

7. *Food and milk.*

(*a*) Inspection upon delivery.

(*b*) Cold-storage facilities.

(*c*) Regulations governing use of raw foods, especially in tropics.

(*d*) Inspection of "bumboats" and other vendors of foodstuffs.

(e) Bacteriological and chemical standards for milk.

(*f*) Requirements as to pasteurization, certification, etc.

(*g*) Inspection of sources of milk supply. (This may often be obtained from the local health department.)

(*h*) Examination of milk and food handlers.

8. *Housing.*—Ventilation, lighting, screening, heating, plumbing, and other sanitary features.

(*a*) Barracks, including tents.

(*b*) Quarters.

(*c*) Industrial buildings.
(*d*) Amusement halls.
(*e*) Drill halls.
(*f*) Lecture rooms.
9. *Garbage and refuse.*
(*a*) Methods of collection.
(*b*) Disposal—incineration, fed to hogs, etc.
(*c*) Nuisances arising from handling garbage or refuse.
10. *Sanitary nuisances.*
(*a*) Rats and vermin.
(*b*) Flies and mosquitoes—breeding place.
(*c*) Dust and smoke.
(*d*) Stables and manure.
(*e*) Sources of odors.
(*f*) Unnecessary noises.
11. *Industrial hygiene.*—Hazards affecting life and health.
(*a*) Accident prevention—safety devices.
(*b*) Industrial diseases encountered.
(*c*) Regulations controlling employment of civilian personnel—physical examination.
12. *Athletic activities.*
(*a*) Proportion of personnel engaging in athletic sports.
(*b*) Are men engaged in strenuous athletics under medical supervision?
13. *Communicable diseases.*
(*a*) Provisions for isolation.
(*b*) Regulations for the prevention of cross infection.
(*c*) System for tracing sources of infection, both places and persons.
(*d*) Methods of control—are instructions for control of communicable disease contained in United States Naval Medical Bulletin of January, 1922, available?
(*e*) Are special charts, maps, etc., for recording incidence of communicable disease in use?
(*f*) Survey of communicable disease situation in vicinity, including venereal.
15. *Vital statistics.*
(*a*) Morbidity and mortality rates compiled and recorded for purposes of comparison?
16. *Miscellaneous.*
(*a*) Barber shops.
(*b*) Restaurants.
(*c*) Canteens, post exchanges, etc.
(*d*) Wharves.

(*e*) Educational propaganda used.

(*f*) Supervision of health records to check smallpox and typhoid vaccination.

DISCUSSION.

1. *Geographical positions, etc.*—The longitude, latitude, and elevation of the station should be stated, as well as its locality in relation to the nearest large city or body of water. It is most important that the general terrane of the land be fully understood in order that proper drainage facilities may be provided. Such information may be obtained from physical inspections and examinations of maps of the Bureau of Yards and Docks. The geological formation is important in relation to water supplies and drainage projects especially in communities depending, in part, on water supply from wells and springs, and where at the same time privies and cesspools exist. For instance, where there is limestone formation cesspools may easily infect water supplies through crevices in the strata.

Under climate such facts should be considered as dry and wet seasons and periods of year when disease-bearing insects are abundant.

2. *Character of personnel, etc.*—The medical officer should know the type of naval and civilian personnel for whose health he is responsible. Where seasoned naval personnel and high-grade mechanics predominate the problem is much different than when dealing with recruits or day laborers. The type and character of the surrounding population also has an important bearing.

3. *Local public health practices, etc.*—Inasmuch as the naval personnel mixes largely with the surrounding population, it is evident that it is necessary for the health officer of the station to have detailed knowledge of the health laws and practices of the adjacent communities.

4. *Organization.*—It is necessary for the senior medical officer to have a complete outline of the previous organization of the sanitation and public health division in order that he may give these activities their proper place in his own organization.

5. *Water.*—The senior medical officer is always responsible for recommendations as to the safety of the water supply. It devolves upon him, therefore, to be thoroughly acquainted with every aspect of this question, to know what recommendations have been made in the past, and to determine whether he is willing to indorse these for the future. He should at once personally inspect the source of supply, watershed, methods of collection, purification, storage, distribution, etc., with a view to determining for himself the question of safety. Although bacteriological and chemical analyses of water are most important, they should never be allowed to take the place of personal inspections, but should supplement them.

6. *Sewage.*—Whereas most stations have satisfactory water-carriage sewerage systems, unfortunately a few have to contend with privies, cesspools, etc. When such is the case, possible contamination of the water supply and the spread of filth and disease from them by insects must, of course, be considered. Furthermore, at some stations the outlet of the water-carriage system may contaminate the water supply of the station or other communities. In such cases it is most important for the medical officer to be cognizant of this fact, so that he may make proper recommendations.

7. *Food and milk.*—Generally speaking, the question of food and milk is not a difficult part of the medical officer's work at shore stations in the United States, since standards of production and marketing are high in most localities adjacent to naval stations. Still, since the medical officer is directly responsible for all foodstuffs received and also for their sanitary care and preparation after receipt, he should make sure that all safeguards are taken to prevent the occurrence of infection from this source. Unfortunately, at some stations in the United States, and very frequently abroad, the methods of handling milk are not the best. Consequently, pasteurization, checked by laboratory tests, should be invariably insisted upon. In this way milk-borne epidemics may be prevented.

8. *Housing.*—In considering ventilation, lighting, screening, heating, plumbing, and other sanitary features of housing, the medical officer should endeavor to attain not so much the ideal as the practical, and he should demand only those essentials which have a true and direct bearing upon health.

9. *Garbage.*—Aside from the esthetic aspects of this question, it should be remembered that garbage is an attraction for rats and vermin, and its proper disposal frequently eliminates these pests.

10. *Sanitary nuisances.*—Sanitary nuisances can not be controlled unless there is a well-organized sanitary squad detailed for this work alone. A trained hospital corpsman should be in charge of a squad.

11. *Industrial hygiene.*—The industrial activities of shore stations were discussed in "Notes on preventive medicine," Naval Medical Bulletin of March, 1922.

12. *Communicable diseases.*—The survey under this heading should include the acquirement of knowledge of the most frequent communicable diseases prevailing from time to time at the station and in the surrounding community. Weekly reports might be exchanged between the station and neighboring health officers. In this connection, it would seem advisable for each station to keep such graphic records as spot charts and incidence curves which would point to the origins of diseases and show their seasonal prevalence.

STERILIZATION OF WATER MAINS ON THE U. S. S. "MISSISSIPPI."

By FREDERICK G. ABEKEN, Commander, Medical Corps, United States Navy.

On May 5, 1921, while anchored in the inner harbor at San Diego, Calif., an official radiogram was received from the senior officer present that the water supply of San Diego was probably polluted and dangerous for drinking purposes, due to contamination of water in shifting reservoir. At the time of receipt of this radiogram, the water barge was alongside the ship, and 20,000 gallons of San Diego water had already been taken on board. An investigation showed that the fresh-water mains, piping, and tanks throughout the ship were probably contaminated. A serious problem confronted the medical officer and something decisive had to be done immediately other than issuing orders against the use of water. A previous analysis of this water had shown gas formation in 1, 2, 3, 4, and 5 cubic centimeter quantities. A careful study of the various leads of the water system and of the heating system suggested a simple and practicable solution of the problem, which proved effective within an hour after receipt of the radiogram.

Our procedure was as follows: After a conference with the engineer officer, 22,000 gallons of the polluted water were pumped overboard. Hose connection was made to the forward heating system in mess attendants' quarters, which is supplied with auxiliary exhaust steam at a pressure of 10 pounds. The hose was led into the crew's space, a distance of 30 feet, and connected to the fresh-water system there. Live steam was run into it for about 1 hour. This line leads into the water main and thence to the pump and all fresh-water piping, including the tanks and its filling lines. Live steam was in all parts of the water system for about 45 minutes. It could be seen issuing from all outlets, scuttle butts, etc.

Repeated analysis of water proved the effectiveness of this simple and unique method.

HEALTH CONDITIONS OF THE NAVY.

There has been a decided improvement in the health conditions of ıe Navy during the past month. For the four-week period ending .pril 8, 1922, the morbidity rate for all causes, entire Navy, was 570 er 1,000 per annum, as compared with 802 per 1,000 for a similar eriod of 1921, and 810 for 1920. The annual admission rate for the ıme period for diseases only was 519 per 1,000 per annum and for :cidents and injuries 51 per 1,000 per annum.

The annual admission rate for communicable diseases, exclusive of ıfluenza and the venereal diseases, for the week ending April 8 was) per 1,000 per annum, as compared with a rate of 136 for a similar eriod last year. In the analysis of the communicable diseases it is)und that malaria has the highest rate for all communicable dis-ıses except influenza and the venereal diseases. The following table ıows the comparison of the rates for March, 1922, and the average)r the three previous years:

nnual admission rates per 1,000 for certain communicable diseases, current month of March, 1922, in comparison with the mean annual admission rates, month of March, for the four-year period 1918–1921, inclusive.

	March, 1918–1921.	March, 1922.
erebrospinal fever	0.42	0
iphtheria	2.89	0.31
erman measles	1.78	3.38
ıfluenza	52.73	154.61
alaria	6.88	15.86
easles	9.01	.51
umps	33.22	1.02
neumonia	11.73	3.28
oliomyelitis	0	0
arlet fever	3.04	.61
nallpox	.76	.61
uberculosis	3.14	2.25
yphoid fever	.02	0

There have been few communicable diseases at training stations or ıore stations in the United States. The only disease of any inter-st during the past month at shore stations was malaria, with a rate f 7.4 per 1,000 per annum; the majority were reported from Quan-ico, Va.

The annual admission rate for influenza for the week ending April was 37.1 per 1,000. Attention is invited to a summary of the ıfluenza epidemic printed in another part of this Bulletin.

The admission rates for tuberculosis, as usual, have been higher for the forces afloat than for shore stations. However, it is rather noteworthy that during the first three months of the present year the rate for shore stations has fallen considerably below a three-year norm.

During the past month the curve of the venereal disease rates has been acting very peculiarly. For the first time in three years the average rate for venereal diseases ashore for a four-week period was above that for the forces afloat. The annual admission rate for venereal disease, entire Navy, for the year is now 119 per 1,000 per annum.

The mortality rate for the Navy for the four-week period ending April 8, 1922, was 2.3 per 1,000 per annum.

INFLUENZA IN THE NAVY, JANUARY 1 TO APRIL 1, 1922.

Now that the morbidity rates for influenza for the entire Navy have approached normal level for this season of the year, it seems an appropriate time to discuss briefly the epidemic of influenza which has just passed. Influenza first appeared in ships which were or had been recently in New York. The following weekly morbidity rates as kept in the Bureau of Medicine and Surgery give a picture of the curve for influenza for the entire Navy from January 7 to April 1, 1922:

Week.	Annual admission rate per 1,000.
Jan. 7	5
Jan. 14	9
Jan. 21	30
Jan. 28	110
Feb. 4	185
Feb. 11	254
Feb. 18	220
Feb. 25	350
Mar. 4	380
Mar. 11	325
Mar. 18	120
Mar. 25	110
Apr. 1	50

At first it was thought that February 1 would mark the peak of the epidemic, but soon afterwards reports from the Pacific Fleet were received in increasing numbers, together with reports from ships and stations on the Atlantic seaboard. The peak of the epidemic was finally reached on March 4. From then on there was a rapid decline. The following table shows the incidence of influenza in the entire Navy, the forces afloat, and the forces ashore in the United States:

	January.				February.				March.			
	Number of ships and stations reporting.	Number of cases.	Annual rate per 1,000.	Percentage of all admissions.	Number of ships and stations reporting.	Number of cases.	Annual rate per 1,000.	Percentage of all admissions.	Number of ships and stations reporting.	Number of cases.	Annual rate per 1,000.	Percentage of all admissions.
Entire Navy	500	963	115.5	17.6	389	2,913	249.6	41.0	360	1,476	139.41	22.3
Forces afloat	468	775	139.4	20.3	357	1,513	263.1	21.42	227	276	36.28	7.2
Atlantic Fleet	220	578	274.8	26.6	206	238	99.9	14.5	123	73	21.93	9.9
Pacific Fleet	248	197	57.1	11.1	151	1,275	380.7	58.3	104	203	62.78	21.2
Forces ashore	32	188	75.2	11.7	32	1,400	560.0	44.7	32	194	70.48	11.2
Atlantic stations	31	185	72.0	11.6	27	1,139	639.5	43.2	27	176	79.40	13.2
Pacific stations	1	3	37.8	10.4	5	260	520.0	49.8	5	18	30.27	7.4

In the examination of the above table it will be seen that the Atlantic Fleet suffered from the attack first and had its highest rates in January, whereas the Pacific Fleet had its highest rates in February. In the examination of the rates for shore stations it will be seen that the Atlantic stations were also first attacked, but in neither the Atlantic stations nor the Pacific stations did the rates reach any considerable proportion until the month of February. The following table gives the minimum, mean, and maximum rates for the forces afloat and forces ashore; the minimum rate is the lowest rate for any ship or station; the mean rate, the average rate; and the maximum rate, the highest rate.

	January.			February.			March.		
	Minimum rate.	Mean.	Maximum rate.	Minimum rate.	Mean.	Maximum rate.	Minimum rate.	Mean.	Maximum rate.
Entire Navy	0	115.5	1,045.4	0	249.6	1,482.2	0	139.4	1,350.0
Forces afloat	0	139.4	1,045.4	0	263.1	1,482.2	0	36.28	1,350.0
Atlantic fleet	0	274.8	1,045.4	0	99.9	545.9	0	21.93	366.1
Pacific fleet	0	57.1	771.2	0	380.7	1,482.2	0	62.78	1,350.0
Shore stations	0	75.2	1,300.0	0	560.0	1,072.0	0	70.48	151.5
Atlantic stations	0	72.0	1,300.0	0	639.5	1,072.0	0	79.4	151.5
Pacific stations	0	37.8	37.8	0	520.0	1,240.0	0	30.27	148.5

From January 1 to April 1 the average complement for the entire Navy was 128,951. During this period there were 5,352 admissions with influenza, giving an admission rate of 166 per 1,000 per annum and an attack rate of 4.1 per cent. The attack rate for the 1918 epidemic was 15.08 per cent and for the 1920 epidemic 6.62 per cent.

Of the 5,352 cases admitted with influenza only 10 died. During the epidemic the annual death rate for influenza for the entire Navy was 31 per 100,000 and the case fatality rate was 0.18 per cent.

From the reports received from ships and stations, some of which are published in this issue, it is evident that the disease was mild in character. However, when it is considered that approximately 25,000

working days were lost as a result of influenza from January 1 to April 1, it is apparent that the epidemic caused considerable damage to the Navy.

REPORT OF EPIDEMIC OF INFLUENZA IN DESTROYER SQUADRON, UNITED STATES PACIFIC FLEET.

The recent epidemic of influenza occurring in these squadrons extended roughly from the last two weeks in January to the first week in March, 1922. This prolonged duration of the epidemic was due to the fact that vessels of the squadrons were located at the navy yard, Bremerton, Wash., the navy yard, Mare Island, Calif., and at San Diego, Calif., each group being successively attacked.

The type of the disease was much less severe than that of the epidemic of 1918, but much more severe than the influenza that has been reported as such between 1918 and 1922.

During this epidemic temperatures of 103 to 104, severe headache, body pains, and an acute bronchitis were common symptoms. The disease as a rule ran a short course of from three to five days. Complications were infrequent and consisted almost entirely of a few cases of broncho-pneumonia. Sequelae consisted principally of pronounced weakness and feeling of lassitude, occurring during convalescence, which lasted for a week or more. Subnormal morning and evening temperature was usual during convalescence. Pulmonary secretions were thick and tenacious. The inflammatory process was slow in subsiding. Many cases of acute and subacute conjunctivitis were observed toward the close of the epidemic. Ear and sinus involvement appeared to be rare. One death occurred in hospital from broncho-pneumonia.

The repair group at the navy yard, Puget Sound, were the first vessels of the squadrons to be attacked; all eight destroyers in this group reported cases. The epidemic extended from the latter part of the second week in January to about the 7th of February. In all there were 39 cases, 11 of which occurred on one vessel.

The repair group at the navy yard, Mare Island, and the Thirteenth Division awaiting sailing orders to the Asiatic, were the next to be infected. The epidemic period for this group occurred during the first weeks of February. Nineteen cases were reported from these 13 destroyers.

The epidemic among vessels of the squadrons in San Diego Harbor began on February 13, 1922, reached its height on February 27, and dropped rapidly to one case on March 1. Scattered cases were reported until March 7. Seventy-four cases were the greatest number reported on a single day.

The following tables show the incidence of influenza among vessels at San Diego during the epidemic:

	Number of vessels at San Diego.	Number of vessels having cases.	Average complement.	Number of cases.	Cases per 1,000 of complement.
Destroyers	85	58	5,596	348	62.1
Tenders	2	2	873	96	109.9
Cruisers	1	1	429	66	153.8
Total	88	61	6,898	510	73.9
Destroyers with full complement	25	21	2,132	217	101.7
Destroyers with 50 per cent complement	60	37	3,464	131	37.8

REPORT OF EPIDEMIC OF INFLUENZA ON BOARD THE U. S. S. AROOSTOOK.

About February 15 sporadic cases of influenza appeared in the city of San Diego and a number of cases occurred among the personnel of the naval vessels in the harbor. This apparently was the extension of the world-wide epidemic which had appeared in England and Europe about six weeks previously.

The epidemic began in the air squadrons with sporadic cases. By February 23, the number of cases had increased to such an extent that it became necessary to place cots in a compartment adjacent to the sick bay in order to care for the numerous admissions. The general policy, adopted at the onset, was to admit mild cases to the compartment, place the more severe cases in the sick bay, and when the latter became crowded, to transfer the more seriously ill to the naval hospital, San Diego, Calif. In this way space was always kept available for new admissions and at the same time the hospital was not crowded with milder cases or even the more severe cases so long as the sick-bay space was available aboard ship. Fortunately the epidemic was short lived. The peak was reached on February 25, and from then on there was a gradual subsidence. To-day (Mar. 4), it can be said to be over, although a few straggling cases will probably be admitted during the next few days.

For the ship plane squadrons on North Island, the junior medical officer had a ward in the dispensary of the naval air station. Milder cases among officers were cared for in their homes. The more serious cases were transferred to the hospital.

All cases showed similar signs and symptoms. The symptom complex was sudden onset with chilliness, prostration followed by temperature from 101 to 104, pulse rate from 100 to 120, marked congestion of the face and eyes, severe frontal headache, generalized aching of the entire body, and leucopenia. Some cases had, in ad-

dition, a dry painful cough, substernal pain, and sensation of pressure on the chest. The course of the acute symptoms was from two to three days. All cases showed considerable weakness, and at least one or two days of normal temperature was necessary before a patient was allowed out of bed and several days for recuperation before restoration to duty. The total admissions in the air squadrons was about 100. Many of these cases were mild, but a considerable number were so severe as to recall the epidemic of 1918. There were, however, no deaths and few complications.

REPORT OF EPIDEMIC OF INFLUENZA ON THE U. S. S. PENNSYLVANIA.

An epidemic of influenza occurred on the U. S. S. *Pennsylvania* while anchored in San Francisco Harbor. At the same time the disease was epidemic in all the cities on the west coast. On February 10, 1922, it was estimated that there were 20,000 cases of this disease in San Francisco, Calif. The epidemic continued until February 23, 1922, no cases occurring thereafter. During these 18 days 125 cases occurred. The peak of the epidemic was reached on February 8. The admissions for February 8, 9, and 10 were 28, 23, and 15, respectively. The maximum number of sick occurred on February 10, when there were 65 cases under treatment.

The disease was found to be highly contagious. The period of incubation in many cases was noted to be 48 hours. Those who were constantly present in attendance on the sick room soon became infected with the disease. On February 10, 1922, the junior medical officer and 50 per cent of the Hospital Corps men were ill with the disease.

All cases of influenza were isolated throughout the entire period. When the sick bay and isolation ward became filled, the chief petty officers' quarters on the main deck were occupied by the sick. As the number of cases continued to increase, it became necessary to curtain off a section of the main deck. This temporary infirmary could be enlarged at will, and it communicated with the starboard water-closet. Patients were placed in cots upon which their own blanket rolls were spread. Because of the inclement weather, the medical officer recommended that no liberty be granted for four days. There was no quarantine of the ship recommended, as the disease was present on board other ships and on shore. As about 50 per cent of the Hospital Corps men were incapacitated through illness, four men from the deck divisions were detailed to assist in the work of the Medical Department.

The symptoms of the disease varied somewhat from previous epidemics. Attacks began usually in the early morning hours and were ushered in by chilliness, vertigo, headache, and pain in the chest. The fever was usually between 100 and 102° F. Sore throat

nd characteristic hard, nonproductive, and paroxysmal cough were arly symptoms. There was desided prostration and a marked tendncy to relapse. There was a relapse in one case after having been p and about for eight days. Few complications resulted. There ere several cases of hyperpyrexia and one case of bronchorrhoea. ll the cases ended in recovery, although convalescence was freuently slow. The duration of the attack varied from two days, four ays, or six days, according to severity. All cases were kept in bed ntil 24 hours after the temperature had reached normal. The most triking points in connection with this epidemic were the paroxsmal, nonproductive cough, the sense of constriction about the hest, the tendency toward relapse, and the very evident contagion uffered by those who were most exposed. The prostration in these ases did not vary from that noted in former epidemics.

NOTES FROM U. S. NAVAL TRAINING STATION, HAMPTON ROADS, VIRGINIA.

Influenza.—On the 28th and 29th of January a gale of wind, accompanied by a heavy fall of snow, swept through this section. Exosure of personnel during the succeeding few days was apparently he exciting cause for a brisk outbreak of influenza, for on the 3d of ebruary 14 cases were admitted. There was an increase on each ucceeding day up to the 7th of the month. The weather was very ad during much of the month, and this doubtless had its effect upon he spread of this disease. After the 7th a gradual decline was vident, slow from the 7th to the 13th, after which date the decline as rapid. A total of 281 cases were admitted during the month. ick quarters, serving all activities on the base, handled altogether omething over 400 cases of influenza.

As soon as it was found that the epidemic was an actuality, we stablished the practice of sending out a patrol from each unit disensary four times a day. Hospital Corps men went into each buildng and hunted out men who apparently were under the weather, but ot sufficiently ill to seek the aid of a medical officer. All such men ere taken to one of the various dispensaries, and if it was found hat they had fever of any degree they were immediately transferred o sick quarters and put to bed. Probably more than half of the dmissions were made in this way, and it is believed that the action aken served to diminish the bad results that would have followed ad all men been allowed to follow their own inclinations in seeking edical assistance. At the same time special precautions were taken n the sterilization of mess gear in the various galleys and efforts t control along other lines were persisted in. At no time were the ast majority of cases of a serious type, and only half a dozen cases f pneumonia appeared among them. It was necessary to open four

additional wards at sick quarters to care for all patients at the height of the epidemic. This was done without confusion, since the wards had been previously prepared for just such an emergency. The Hospital Corps personnel was not sufficient for all purposes, therefore the commanding officer provided enough seamen for cleaning and other details so that the Hospital Corps men available could be used for strictly professional duties. Under the method of procedure outlined few cases were ill more than six days.

The following report from the laboratory division shows the bacteriological and blood work done among influenza patients:

LABORATORY WORK ON INFLUENZA.

The following table gives the result of the laboratory examination of the nose and throat secretions from 30 influenza cases:

	Cases.	Per cent.
Hemolytic streptococci	17	56⅔
Nonhemolytic streptococci	15	50
Bacillus Pfeiffer	10	33⅓
Tiny bodies, almost invisible (gram negative and stained difficult with ordinary nuclear dyes)	3	10

The following table shows the results obtained from the examination of sputa from 25 cases of influenza:

	Cases.	Per cent.
Hemolytic streptococci	15	60
Nonhemolytic streptococci	10	40
Baccillus Pfeiffer	8	32
Tiny bodies, almost invisible (gram negative and stained difficult with ordinary nuclear dyes)	2	8¼

Blood cultures were made on 25 cases of influenza, and no positives were noted using agar as a basis of the media.

Thirty leucocyte counts and 30 differential counts were made on influenza cases. The following is the average of the differential counts:

Leucocytes.	Average per cent.	Maximum per cent.	Minimum per cent.
Polymorphonuclears	60.0	82.0	36.0
Large and small lymphocytes	26.6	55.0	8.0
Large mononuclears	7.8	20.0	2.0
Transitionals	2.0	4.0	0
Eosinophiles	.66⅔	3.0	0
Basophiles	.2⅔	1.0	0
White-blood counts	8,417	13,150	4,100

As we had no sodium oleate on hand and the epidemic was of such a short duration, we did not deem it advisable to procure any. We were unable to make Avery's oleate media, and as result of this we probably failed to isolate *Bacillus Pfeiffer* in the number of cases in which it was actually present. We did, however, in some cases use chocolate agar, which is acknowledged to be superior to blood agar in the isolation of *Bacillus Pfeiffer*, and as result obtained a higher percentage of positives for *Bacillus Pfeiffer* than we would have obtained using blood agar. Had the epidemic been of long duration, we would have obtained sodium oleate and might have been able to show a much higher percentage of positives for *Bacillus Pfeiffer.*

THE RECENT INFLUENZA EPIDEMIC DIFFERENT FROM 1918 ATTACK.

The following is quoted from the Statistical Bulletin, Metropolitan Life Insurance Co.. for March, 1922:

"So far as present indications show, the influenza that has prevailed during the last few months was very different in age distribution of fatal cases from that of the 1918–19 invasion. In the world pandemic of 1918 the deaths were largely concentrated between the ages of 20 to 40. In the last few months the deaths have been concentrated in early life and more particularly in old age. About one-half of the deaths were those of persons over 45 years of age. In this respect they were distributed very much as pneumonia deaths generally were before the epidemic period set in. This fact is an additional indication that what has transpired during the last few months has not been a recrudescence of the serious influenza epidemic of three years ago, but is something very similar to what happens every winter with the increase in influenza cases and of primary pneumonias. If the number of cases and deaths for this year has been higher than last year, it is chiefly because that for last year was exceptionally low. In fact. the rate for respiratory disease this February can not be considered a high figure according to the standards of a few years ago."

These are the conclusions reached by the Metropolitan Life Insurance Co., which has made a study of the death claims presented during four recent weeks in the cases of 1,752 decedents whose deaths were reported as due either to influenza or pneumonia.

The deaths studied occurred over a wide area; in fact, almost every State and Canadian Province is represented. Nevertheless, there has been a distinct concentration in the northeastern section of the country—more particularly along the Atlantic seaboard.

Almost one-half of these 1,752 deaths of Metropolitan industrial policy holders occurred in the States of New York, New Jersey, Pennsylvania, and Massachusetts. This would indicate either that the disease was much more widespread in these northeastern States or that it was present in a more fatal form than in the rest of the country.

PREVENTIVE MEDICINE WARNING POSTERS.

There will be distributed to all ships and stations at an early date a series of 18 small posters dealing with disease and accident prevention. Managers of industrial organizations have found this method of disseminating accident prevention propaganda to be very effective in reducing the number of casualties. It is hoped that the disabilities resulting from injuries in the naval service can be similarly reduced.

Safety engineers in industrial plants, who are members of the National Safety Council, by pooling their ideas are able to publish a number of very good posters every month. In a similar manner it is suggested that medical officers prepare bulletins dealing with their individual problems and send copies of those that have been found especially good, and are suitable for general service use to the Bureau of Medicine and Surgery. The senior medical officer on the U. S. S. *Wyoming* in his annual sanitary report gives examples of the bulletins he has had made and posted following each accident that occurred on the ship. Other warning posters dealing with influenza, malaria, and "colds" have been received by the bureau. Photographs, diagrams, or drawings add greatly to the value of these posters. If this plan is followed out sufficient valuable material can soon be acquired by the bureau and a series of posters of this type published periodically.

THE VALUE OF EARLY VENEREAL PROPHYLAXIS.

The question has arisen whether the Forms A give a true estimate of the value of medical prophylaxis against the venereal diseases. It may be true that the individual taking prophylaxis does not always report accurately the actual time having elapsed after exposure and moreover there may be inaccuracies as a result of carelessly prepared forms, but with such a large number of reports as have now been accumulated from so many different places it is believed that fallacies are smoothed out in the ultimate analysis. Un-

oubtedly the effect of such inaccuracies will become progressively ss as the totals increase.

Since the work of analyzing the reports commenced, it has been oted that venereal disease follows in approximately the ratio of to 100 when all treatments are considered and 2 to 100 when the ne-hour treatment is considered. This continues to be substantiated the present analysis of 141,831 treatments, as shown in the following table:

Organization.	Total number of prophylactic treatments.	Treatments within 1 hour.	Infections following treatments taken within 1 hour.	Percentage of infections following treatments taken within 1 hour.	Treatments during second hour after exposure.	Infections following treatments taken during second hour after exposure.	Percentage of infections following treatments taken during second hour after exposure.	Treatments during third hour after exposure.	Infections following treatments taken during third hour after exposure.	Percentage of infections following treatments taken during third hour after exposure.	Treatments during fourth hour after exposure.	Infections following treatments taken during fourth hour after exposure.
st quarter, 1921:												
Atlantic Fleet	23,411	9,074	154	1.7	4,421	99	2.2	2,462	112	4.5	1,826	76
Pacific Fleet	9,605	1,165	60	5.1	1,237	45	3.6	1,294	57	4.4	1,254	57
Asiatic Fleet	6,873	1,773	31	1.7	1,512	54	3.5	953	60	6.3	617	59
Shore stations	6,794	2,802	50	1.8	1,403	46	3.3	824	47	5.7	443	30
Entire Navy	46,683	14,814	295	2.0	8,573	244	2.8	5,533	276	5.0	4,140	222
eviously reported, entire Navy, first three uarters, 1921	95,148	21,508	423	2.0	18,013	551	3.1	13,511	486	3.6	10,153	533
tire Navy, calendar ear 1921	141,831 [1]	36,322	718	2.0	26,586	795	3.0	19,044	762	4.0	14,293	755

Organization.	Percentage of infections following treatments taken during fourth hour after exposure.	Treatments during fifth hour after exposure.	Infections following treatments taken during fifth hour after exposure.	Percentage of infections following treatments taken during fifth hour after exposure.	Treatments during sixth hour after exposure.	Infections following treatments taken during sixth hour after exposure.	Percentage of infections following treatments taken during sixth hour after exposure.	Treatments from sixth to twelfth hour after exposure.	Infections following treatments taken within 6 to 12 hour after exposure.	Percentage of infections following treatments taken within 6 to 12 hours after exposure.	Treatments after 12 hours after exposure.	Infections following treatments taken after 12 hours after exposure.	Percentage of infections following treatments taken after 12 hours after exposure.
st quarter, 1921:													
Atlantic Fleet	4.1	1,375	55	4.0	1,604	62	3.8	1,983	128	6.4	666	67	10.0
Pacific Fleet	4.5	907	27	2.9	1,071	39	3.6	2,043	106	5.2	634	50	7.9
Asiatic Fleet	9.5	429	44	10.2	437	53	12.3	995	139	13.9	157	26	16.5
Shore stations	6.7	231	20	8.6	237	17	7.2	640	50	7.8	214	19	8.9
Entire Navy	5.3	2,942	146	4.9	3,349	171	5.1	5,661	423	7.4	1,671	162	9.7
eviously reported, ntire Navy, first hree quarters, 1921	5.2	7,099	353	5.0	6,900	455	6.6	13,791	739	5.4	4,170	305	7.3
tire Navy, calen- ar year 1921	5.3	10,041	499	4.9	10,249	626	6.1	19,455	1,162	5.9	5,841	467	8.0

[1] This does not include treatments reported on old Forms A.

DISCUSSION OF THE TABLE.

Of the 36,322 treatments given during the first hour after exposure 718, or 2 per cent, were followed by infection. The relatively high rate of 5.1 per cent for the first hourly period for the Pacific Fleet during the last quarter of the year was due to the fact that the U. S. S. *Tennessee* reported in December that 38 treatments taken during the first hour were followed by infections in 15 instances and that the U. S. S. *Asheville* reported that 171 such treatments were followed by 16 infections in November and December. This may have been caused by a group of exposures to an acutely infected person, to careless use of the prophylactic treatment, or possibly to false statements to the medical officer, but in the ultimate analysis such transient and local conditions have comparatively little influence on the final totals. The ratio of 2 per cent of infections for the first hourly period has remained fairly constant throughout the year for all organizations, and as the total has exceeded 36,000 treatments it is sufficiently large from which to draw accurate conclusions. Two per cent may, therefore, be considered the average number of infections that will follow medical prophylatic treatment given under usual service conditions within one hour after exposure. For this reason, medical officers should avoid giving the impression to the men that the early use of venereal prophylatic treatment will entirely eliminate the risk of acquiring disease.

By reference to the table it will be noted that there were 26,586 treatments taken in 1921 during the second hour after exposure, of which 795, or 3 per cent, were followed by disease. Four per cent of infection followed treatment taken during the third hour, and $5\frac{3}{10}$ per cent followed treatments taken during the fourth hour. It will be seen that a definite and progressive increase of approximately 1 per cent of infections occurs for every hour that prophylatic treatment is postponed from the first to the fourth hour after exposure.

During the fifth hour there is an apparent slight decrease, possibly due to the comparatively few treatments reported for this period. From the beginning of the sixth hour to the end of the twelfth hour the rate of infection is 6 per cent; this may be considered as the usual rate of infection without any prophylaxis. If we assume this to be true, the 36,322 treatments which were given during the first hour and which were followed by 2 per cent of infections may be presumed to have prevented 1,436 cases of venereal disease; the 26,586 given during the second hour, 795 cases; the 19,044 given during the third hour, 381 infections; the 14,293 given during the fourth hour, 100 infections; and the 10,041 given during the fifth

hour. 110 infections. In other words, a total of 2,838 cases of venereal disease were prevented by medical prophylactic treatment during the year 1921. This figure does not take into consideration the treatments reported on the old Forms A, used by many ships and stations during the early part of the year, which did not contain data relative to the time elapsing between exposure and treatment.

From an analysis of the table and an examination of the individual Forms A it appears that men taking treatment after 12 hours following exposure undoubtedly did so to avoid punishment, and in many instances, no doubt, disease had already developed. Several reports were noted in which the number of cases of disease exceeded the number of treatments given for that period and many others when the infections were equal, or almost equal, to the number of such treatments. Since it is well known that a certain proportion of men exposing themselves to infected women escape disease, the frequency of cases of disease reported on Forms A for the period after 12 hours following exposure, which approximate the number of recorded treatments for that period, indicates that false statements have been a considerable factor in increasing the rate of infection to 8 per cent. This source of error probably does not enter so largely into the other periods.

The compilation of data from Forms A seems to be the only practical method of getting information as to the value of venereal prophylaxis. Moreover, these reports furnish data for the venereal tables which are published in the Naval Medical Bulletin each month. Many medical officers have stated that such tables are of great value, as they permit comparisons. Therefore, it is requested that all medical officers continue to cooperate with the Bureau of Medicine and Surgery by obtaining as accurate data as possible. All reports are edited carefully and a few containing manifest errors have to be discarded.

NOTES FROM UNITED STATES NAVAL TRAINING STATION, SAN FRANCISCO, CALIF.

Influenza.—General admission rate to sick list jumped from 812 per 1,000 in January to 1,786 per 1,000 in February. This was due entirely to an epidemic of influenza, with a case incidence of 147. Of this number, four developed pneumonias, all of whom recovered and were returned to duty.

As shown in following table, the peak of admissions was reached on February 6, two days after the character of disease was recognized.

Cases of Influenza, Yerba Buena Island, February, 1922.

Date developed.	Main barracks.	Camp Farragut.	Receiving ship.	Sick quarters.	Hospital Corps training school.	Civilians.
Feb. 1	1					
2	2		1			
3	1	1				
4	6					
5	10					
6	29	1	4	1	1	
7	14	2	1			
8	10	1	2		3	
9	3	2	1		2	
10	9	2	1			
11	2	1	1	2	3	
12			1			
13	14	1	1		3	
14					1	
15	2				1	
16	2		1			
18			2			
21			1		1	
22			2			
25			1			
26					1	
27	1					

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, DESTROYER SQUADRONS, UNITED STATES PACIFIC FLEET, FOR THE YEAR 1921.

PREVENTIVE MEASURES.

In the fight against *venereal disease* all the usual methods have been applied; i. e., the administration of the standard medical prophylaxis, instruction of men by lectures, showing of posters and moving picture films, individual instruction to those contracting venereal disease, restriction of the infected, removal of sources of infection ashore, establishment of shore prophylactic stations, inspection of personnel, etc.

Administration of the medical prophylaxis on destroyers is unsatisfactory, owing to the lack of medical department personnel for its proper supervision on most of the vessels. A plan has been adopted for destroyers nested in groups which appears practical and efficacious. In each division of destroyers moored to a buoy there is always at least one "steaming ship" which provides power to the others; all personnel know which is the "steaming ship." All men are instructed by posting notices that the division prophylactic station is maintained on the destroyer lying next to the port side of the "steaming ship." A prophylactic station is equipped on the proper ship each day. Typewritten instructions are posted beside the outfit and a book for entries or a box for slips is provided.

Each man developing a venereal infection is required to fill out a special questionnaire. It is simple in form, and its use is confined to gaining information from which sources of infection ashore may be located and later removed. These questionnaires are forwarded to the field agent of the interdepartmental social hygiene board, who makes use of them in his or her dealings with civilian authorities. Relations with the field agent at San Diego have been cordial and the results obtained with the civil authorities have been rather satisfactory. In the city of San Diego a special hospital is maintained for the treatment of infected prostitutes. The questionnaire has been a valuable aid in segregating the infected, raiding "joints," and suppression of places of ill repute.

Injuries.—Throughout the year all ships have been required to submit reports of all injuries, giving as much information as to the actual cause of the accidents as possible. The object was to detect, wherever possible, causes of injuries which might be corrected. The squadrons medical officer had contemplated the establishment of the office of "safety engineer" for the squadrons and still hopes that this may be accomplished. The officer so detailed would investigate every accident and make recommendations aimed at prevention of further injuries from a like cause. For a portion of the year such a scheme was tried out in the squadrons moored at the East Santa Fe wharf. The results were favorable, but unfortunately circumstances arose which prevented continuation of the plan and its further development, in order that it might be applied to the whole force. However, effort to stimulate interest in the prevention of injuries has been continued. Various causes of injury have from time to time been eliminated.

Two causes of serious injuries are worthy of particular note; namely, magneto cogs in motor dories and water-gauge glasses in destroyer firerooms. The former has been dealt with successfully, but efforts to overcome the latter danger have not as yet reached perfection.

It is to be noted under the section dealing with health conditions that 35.7 per cent of all injuries due to machinery occurred in motor dories and that of all injuries resulting from motor dory engines 60 per cent were directly due to magneto cogs. Many reports from different destroyers bearing the words "Magneto cogs" attracted attention. Upon investigation, it was found that the cogs were exposed and in close proximity to the gas throttle. Furthermore, it was discovered that in this type of unstable craft, handled by one man, it is a very easy matter to slip the fingers into the cogs when manipulating the throttle and that this is very apt to occur when the water is choppy or the throttle is handled without looking at it.

Coxswains state that such a procedure is often necessary in maneuvering motor dories. Orders were issued that magneto cogs should always be kept covered. As a result of this order this type of accident has not appeared in reports during the latter part of the year.

The explosion of water-gauge glasses in the firerooms of destroyers is also worthy of note, as this type of accident results in serious injury and is preventable. During the year four eyes were destroyed as a result of explosion of water-gauge glasses. The loss of one eye from a preventable accident should be sufficient reason for adopting measures to prevent the recurrence of such an accident.

Practically all destroyers have in the same fireroom two type of gauge glasses. The most desirable is the "flat" or "reflex" glass, which is safe and, so far as known, has not exploded in any vessel of these squadrons. Should it explode it would be broken into large fragments. This type of glass is satisfactory but expensive. The "Scotch" glass is unsafe, as it frequently explodes, producing fine fragments. Although it is equally as satisfactory in use as the "reflex" glass and is inexpensive, it is undesirable, inasmuch as all injuries from exploding gauge glasses may be attributed to the "Scotch" glass.

It would appear that these two types of glasses were installed side by side for the purpose of comparative tests. However, as stated above, results indicate that the "Scotch" glass is dangerous. After several such accidents wire screens for "Scotch" glass were placed on the supply table and orders were issued that they should be used. This screen does not stop the finer fragments. Since it acts as an obstruction in reading the glass, it is frequently turned so as to be useless as a protection, or even taken off all altogether. Proof that it does not stop the fine fragments was demonstrated when a "Scotch" glass exploded and a man lost his eye from a small fragment which passed through the authorized screen, which was in proper position at the time. It is not possible to make the screen of finer mesh, as it would then prevent the reading of the glass.

The situation then is this: The "reflex" type is a safe and satisfactory glass, as far as can be ascertained, but because of slight difference in cost the cheaper "Scotch" glass is being used, and an unsuccessful effort is being made to render it safe. In the meantime eyes are still being destroyed. It would appear that the loss of one eye would far outweigh any increased cost resultant upon the installation of a safe glass.

HEALTH CONDITIONS.

Admissions and readmissions for venereal disease were greater than for any other class of disease, the annual rate per 1,000 being

3.31. Diseases of the respiratory system, with an annual rate of 3.54 per 1,000, gave the next highest incidence. Diseases transissible by oral and nasal discharges and diseases of the digestive ystem were relatively high, having a rate of 37.34 and 35.59 per ,000, respectively.

Acute follicular tonsillitis, chronic tonsillitis, and hypertrophy of ie tonsil gave rise to 434 admissions, a rate of 42.09 per 1,000 per nnum, constituting 12 per cent of the total admissions for disease. 'his type of affection is exceeded only by the venereal diseases and tands far in advance of all others, even outdistancing the total of all ommunicable diseases grouped under Classes VIII, IX, X, and XI. uch a high morbidity rate occurring throughout the services from iese affections, coupled with the recognized fact that the tonsil is of ttle or no value, would suggest the advisability of routine removal of onsils upon enlistment.[1]

Diseases of the stomach and bowel (appendicitis, gastritis, enteritis, olitis, autointoxication, constipation, and ulcer of the stomach) and iseases of biliary tract (cholecystitis and cholangitis) caused a total f 205 admissions, with a rate of 19.88 per 1,000 per annum. Of the 59 cases in the first group, 116 were appendicitis. Of the 46 cases in ie latter group, 39 were cholangitis. The large number of cases of cute stomach and bowel affections in these squadrons is quite in conormity with their high rate of incidence throughout the service. 'urthermore, it is known that such disturbances not only affect the eneral health and have a direct and remote causative influence upon ther diseases grouped in other classes, but also give rise to various isabilities occurring later in life. Therefore, their far-reaching ffects and the possible total damage produced can only be guessed at. lowever, the influence of diet in the causation of these ills is well ecognized, and modern investigation has shown many weak points n our present highly civilized foods. Therefore, it would appear iat serious consideration should be given to the components of our avy ration with a view to furnishing larger quantities of essential alts and vitamines.

Venereal disease.—The annual rate for original admissions for ll venereal diseases was 82.01 per 1,000; for gonococcus infections, 4.53 per 1,000; for chancroidal infestions, 11.21 per 1,000; and for yphilitic infections, 6.26 per 1,000. Tenders showed a higher adission rate for total infections and for gonococcus and chancroid nfections than either destroyers or cruisers, but destroyers exceeded oth tenders and cruisers in the incidence of syphilis. The remote ffects of venereal disease is indicated by the difference between the ate for original admissions, 82.01 per 1,000, and that for admis-

[1] This is not approved of by the Bureau of Medicine and Surgery.

sions and readmissions, 93.31 per 1,000. The rate for readmissions in venereal disease cases, 11.30 per 1,000, far exceeds any other readmission rate, and the percentage relationship is equally excessive.

The annual rate per 1,000 for all original admissions for venereal disease for 1921 exceeds that for 1920 by 1.80, which, while in itself but a small increase, indicates that the destroyers are furnishing their quota of increase to the entire service. The increase in the venereal rate for the entire service between 1919 and 1920 was 14.49 per 1,000.

The enviable position of the Pacific destroyer squadrons at the foot of the list in incidence of venereal disease is shown in paragraph 45 of this report. It stands 38.05 per 1,000 below the lowest of all other groups afloat for the first 10 months of the year.

During the year 1,512,726 liberties were reported for the squadrons from an average of 107 vessels, which is equivalent to 152 liberties per man annually on the basis of an average complement of 10,211. Out of this large number of "liberties," 812 new cases of venereal disease developed, or only 0.53 per 1,000; in other words, from every 2,000 liberties only 1 case of venereal disease resulted. Of those "liberties" 11,595 took venereal prophylaxis, so there were at least 7.66 exposures in every 1,000 liberties; in other words, there was at least 1 exposure every time 143 men went on liberty. Of the 11,595 prophylactic treatments taken, infection followed in spite of prophylaxis in 568 cases, or in 48.98 cases out of every 1,000.

At San Diego prophylaxis appears to have been more effective on vessels anchored in the stream than on vessels moored at the wharf and also was more frequently administered.

The city of San Diego, the cities in the San Francisco Bay district, and the cities in the Puget Sound district were visited by the bulk of the men on liberty, both in 1920 and in 1921. Of the liberty areas, upon which the squadrons base, the greatest number of liberties were made in San Diego. The lowest rate of infection, the lowest rate of exposure (as indicated by prophylaxis), and the most efficacious application of prophylaxis occurred there.

The Puget Sound district is the "worst" of the three districts, as the rate of exposures and the rate of infections exceed the other two and at the same time prophylaxis was less efficacious. The marked improvement in the value of prophylaxis in this district for 1921 over that for 1920 is undoubtedly due to the establishment of and greater use of the prophylactic station in Seattle. This station makes it possible for men to obtain prophylaxis much earlier than if they had to wait until they returned to their ships at Bremerton.

INSTRUCTIONS TO MEDICAL OFFICERS.

ircular Letter.
erial No. 169–1922.

JWR–AL 126963(92).
WASHINGTON, D. C.,
March 16, 1922.

o: All medical officers (via commanding officers).
ubject: Officers and men sick on detached duty or leave.
eferences: (*a*) Bu. M. & S. circular letter #126963(92) of December 9, 1919 to all medical officers.
(*b*) Bu. Nav. circular letter #128–19 of September 15, 1919, to all ships and stations.
(*c*) Article 1189, Navy Regulations, 1920.

In order that the medical history of each member of the Navy may be complete and to enable the Bureau of Medicine and Surgery to determine whether or not certain bills for medical treatment are proper charges against the Government, it is directed that medical officers having cognizance of the illness of an officer or enlisted man while on detached duty or leave of absence shall report the matter promptly to the Bureau of Medicine and Surgery.

This circular letter is a revision of and supersedes above-mentioned circular letter of this bureau (Ref. *a*), your file copy of which should be marked "obsolete" and reference made thereon to this letter.

The following items of specific information are desired by the bureau and the report should be made in the order indicated.

Name ———.
Rate ———.
Station ———.
Diagnosis (from nomenclature) ———.
Origin (duty or not; misconduct or not) ———.
Circumstance attending incurrence ———.
Disposition (include date taken ill or injured) ———.
Was he in a duty status, or performing duty at the time? ———.
Was he on liberty or leave (if on liberty, state exact period for which granted and dates from and to)? ———.
Were the services necessary and authorized (and by whose authority)?———.
Were the services of a Naval Medical Officer or a Naval Hospital available? ———.
Remarks ———.

E. R. STITT.

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ircular letter.
erial No. 170–1922.

WJCA: ESK 129733(32).

WASHINGTON, D. C.,
20 March, 1920.

o: All naval hospitals.
ubject: Veterans' Bureau claimants, sentenced to loss of compensation for disciplinary reasons under General Order No. 27–A.
eference: Letter from Director, U. S. Veterans' Bureau REH/eus: 10–Hospital Section, of March 13, 1922.

1. For your information there is quoted herewith the contents of a letter from he director of the U. S. Veterans' Bureau under date of March 13, 1922 REH/eus: 10):

"In order that there shall be on record at each hospital a definite statement from Veterans' Bureau claimants, sentenced to loss of compensation for disciplinary reasons under General Order No. 27–A, regarding their wishes in the matter of an appeal to the district board of discipline and morale, as laid down in section 6, paragraph 2, and section 8, paragraph 1 (a), of General Order No. 27–A, it is suggested that the commanding officers of hospitals under your jurisdiction treating Veterans' Bureau patients be requested to prepare printed or typewritten forms containing the following statement for the claimant's signature:

"——— ——— Hospital.

"Date ——— ———.

"Having been notified of the approval by the commanding officer of the findings of a disciplinary board in my case, which includes loss in compensation of —— per cent and of my right to appeal to the board of discipline and morale at district headquarters, I hereby state that I do (do not) wish to exercise my right to make such appeal.

"This form should be executed by the claimant when notified of the approval of the findings of the disciplinary board by the commanding officer of the hospital."

E. R. Stitt.

Circular Letter. WJCA:ESK 129733(33)
Serial No. 171–1922.

Washington,
27 March 1922.

To: All naval hospitals.

Subject: Re Discharge from hospitals of Veterans' Bureau patients for disciplinary reasons.

Reference: Letter from Director, U. S. Veterans' Bureau REH/eus: 10 Hospital Section of March 21, 1922.

1. For your information there is quoted herewith the contents of a letter from the Director of the U. S. Veterans' Bureau under date of March 21, 1922 (REH/eus:10):

"Requests for authority to rehospitalize beneficaries discharged from hospitals for disciplinary reasons under U. S. Veterans' Bureau General Order No 27–A have become so numerous as to warrant the conclusion that the physical condition of these claimants at the time of trial is not given sufficient consideration. This is especially true concerning the patients discharged from tuberculosis hospitals.

"In order to make clearer certain provisions of General Order No. 27–A and correct misunderstandings concerning certain of its provisions, the following instructions have been prepared, and it is requested that they be sent to the commanding officers of the institutions under your jurisdiction for their information

"1. In general, no patient whose physical condition is such at the time of trial as to clearly indicate the imperative need of hospital treatment should be recommended for disciplinary discharge. Reduction of compensation as authorized in Section VIII, paragraph 1, of General Order No. 27–A is the proper penalty under these circumstances. For offences of a flagrant nature for which reduction of compensation alone is not considered a sufficient punishment, confinement to disciplinary ward and withholding of all special privileges, in addition to loss of compensation, would be justified. In all cases where a discharge from hospital for disciplinary reasons is recommended,

the board should state on Form 1874, under "Recommendation," that such discharge would not, in the board's opinion, be detrimental to patient's health.

"2. In recommending loss of compensation in accordance with Section VIII, General Order No. 27–A, disciplinary boards should specify the *per cent only* of reduction for a period of months and not the actual amount to be forfeited.

"3. The disciplinary board should inform the claimant at the time of trial of his right to appeal the recommendation of the board to the district board of discipline and morale, provided this recommendation is approved by the medical officer in charge. A statement as to the desire of the claimant in this matter should be obtained at the time of the trial.

"There is being added to Form 1874 a space for notation that claimant was notified of his right to appeal and also that he did or did not desire to so appeal from the recommendation of the board.

"4. In case a beneficiary is tried by a board of officers as provided in Section VI, paragraph 4, General Order No. 27–A, and is awarded a minor punishment *not involving discharge or loss of compensation*, this award should take effect on the approval of the findings by the medical officer in charge of the hospital, and the preparation and forwarding to the central office of Medical Division Form 1874 *is not necessary.*

"5. In the case of a claimant who has been discharged for disciplinary reasons requesting rehospitalization before the three months' period, as specified in paragraph 2, General Order No. 27–A, has elapsed, it must be clearly shown from a physical examination that such immediate readmission is absolutely necessary for the patient's welfare or that compliance with the above provision of this order would result in lessening the claimant's chances of ultimate recovery or aggravating his disability."

E. R. Stitt.

Circular Letter. WRJ:THC 125884(34).
Serial No. 172–1922.

Washington, D. C.,
28 March, 1922.

To: All medical officers.

Subject: Surgical instruments, X-ray and laboratory supplies.

1. After July 1, 1922, requisitions for surgical instruments, X-ray and laboratory supplies, except laboratory animals, will be made on Requisition Form 4, and submitted to the bureau for approval.

2. Laboratory animals will be purchased on approved open purchase requisitions.

3. Annual requisitions for the fiscal year 1923, covering the above-mentioned supplies, except laboratory animals, will be returned unapproved.

4. Activities equipped with X-ray outfit and operating laboratories will submit immediately an estimate to the Bureau of Medicine and Surgery for supplies required for these departments for the fiscal year, 1923. Estimates will be specific as to the articles required, the quantity, size, etc., of each item and will be submitted with due regard to economy.

5. All requisitions for surgical instruments shall be submitted to the bureau for approval.

E. R. Stitt.

Circular letter. WSG/T 132680–0(122).
Serial No. 173–1922.

WASHINGTON, D. C.,
April 13, 1922.

To: Medical officers of navy yards and naval stations, via commandant.
Subject: Charges for furnishing steam, coal, and electric light at dispensaries.
References: (*a*) This Bur's. 4th end. #132680 D1 (92), September 21, 1921.
(*b*) This Bur's. letter #132680–0 (122), December 9, 1921.
(*c*) S. & A.'s 6th end. #122–37/122–5, October 10, 1921.
(*d*) S. & A.'s 1st end. #122–37/122–5, March 15, 1922.
(*e*) Y. & D.'s 7th end. #741–1, October 13, 1921.
(*f*) Y. & D.'s 2nd end. #710–1, March 20, 1922.

1. The Bureau of Supplies and Accounts holds—

(Ref. *c.*) "Existing instructions do not require that steam used in dispensaries at industrial navy yards be charged directly against maintenance appropriations. It is probable that at some yards charges of this character are prorated to appropriations as a part of the general yard indeterminate charges."

(Ref. *d.*) "It is believed that no charges should be made to appropriations under the cognizance of the Bureau of Medicine and Surgery on account of coal and electric light furnished to yard dispensaries. This opinion is also in accordance with the recommendation of the board on cost accounting and approved by the Secretary of the Navy that all charges for power at industrial yards be made to 'Maintenance, yards and docks,' or to 'indeterminate expense.'"

2. The Bureau of Yards and Docks states—

(Ref. *e.*) "Dispensaries are a part of the military establishments of navy yards and stations, and the cost of steam for use in the buildings is considered as a charge against yard maintenance appropriations."

(Ref. *f.*) "This Bureau is of opinion that coal and electric current furnished to yard dispensaries is a proper charge against 'Maintenance, yards and docks,' except that at industrial yards they may be charged to 'Indeterminate expense.'"

3. In accordance with the foregoing, charges for steam, coal, and electric current furnished dispensaries at navy yards and stations will *not* be made a charge against any appropriation under the cognizance of the Bureau of Medicine and Surgery.

E. R. STITT.

Circular letter. WJCA:ESK 124680(41).
Serial No. 174–1922.

WASHINGTON, D. C.,
14 April, 1922.

To: All naval hospitals.
Subject: Certificates of illness for insurance and fraternal compensations for Veterans' Bureau patients in U. S. naval hospitals.
Reference: Letter from director, U. S. Veterans' Bureau, dated April 8, 1922.

1. The commanding officers of several United States naval hospitals have received requests from Veterans' Bureau patients for certificates of illness for insurance and fraternal compensations.

2. The Bureau of Medicine and Surgery approves the policy of the Veterans' Bureau in the cases of Veterans' Bureau patients treated in United States naval hospitals, and quotes for your information the above reference:

"In response to the attached inquiry, it is the policy of the Veterans' Bureau to supply to the patients themselves certificates of illness when it is clear that

such certificates are desired for the advantage of the claimant himself, particularly in connection with securing insurance from private or fraternal companies.

"The general policy of the Government not to release medical information has, of course, in view the protecting, first, the patient himself, secondly, the interest of the Government.

"In a case where a certificate is desired to secure insurance from private organizations, it is clear that only the interests of the patient are served and that the Government is quite unlikely to suffer any inconvenience."

E. R. Stitt.

Circular letter
Serial No. 175–1922.

WJCA:ESK 129733(41).
Washington, D. C.,
14 April, 1922.

To: All naval hospitals.

Subject: Right of Veterans' Bureau patients to receive treatment in a soldiers' home in the event of disallowance of claim by Veterans' Bureau.

Reference: Letter from director, U. S. Veterans' Bureau, EKH-frd-10-EO of 7 April, 1922.

1. For your information there is quoted herewith the contents of a letter from the director of the U. S. Veterans' Bureau under date of 7 April, 1922 (EKH-frd-10-EO):

"It is requested that instructions be issued to the commanding officers of all hospitals under your jurisdiction rendering treatment to beneficiaries of the U. S. Veterans' Bureau to insure that a claimant who is hospitalized as an emergency case, pending the adjudication of his claim, will be apprised of his right to receive treatment in a soldiers' home in the event of disallowance of the claim by this bureau, which necessarily terminates his further right to treatment through the bureau.

Any honorably discharged ex-service man who is disabled and in need of medical care and hospital treatment is entitled to receive this treatment at soldiers' home, and it is desired by this bureau that every claimant whose case is disallowed be acquainted with his right in this respect."

E. R. Stitt.

INFORMATION FOR NEXT OF KIN.

REGARDING EXPENSES IN CONNECTION WITH THE PREPARATION, INCASEMENT, AND TRANSPORTATION OF THE REMAINS OF THE DEAD.

All expenses in connection with the preparation, embalming, clothing, and incasement of the remains of Navy and Marine Corps dead and of transportation to such point as may be designated by the next of kin are borne by the Navy Department.

The remains are incased in the Navy standard shipping casket, designed to withstand shipment from the most distant parts of the world and to meet every requirement of the boards of health of foreign countries and of the different States. This casket is used alike for officers and enlisted men, no distinction being made for rank, and it is not customary to make transfer to a more elaborate casket. The United States ensign forwarded with the remains for use at the funeral, and thereafter becomes the property of the next of kin.

Where the next of kin have been informed of the shipment of a body at Government expense, and through some mistake the transportation company endeavors to collect transportation charges, payment should be refused and a

telegram sent immediately to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., collect, stating the circumstances.

After the remains have been delivered to the next of kin at the place designated by them, the Navy Department is unable to defray any of the expenses which may be incurred in connection with the funeral, interment, etc., there being specific law prohibiting such payment. The act of Congress approved October 6, 1917, however, provides for payment by the United States Veterans' Bureau, Washington, D. C., of burial expenses not to exceed $100 in cases where the deceased was in the service prior to February 9, 1922. Unless further legislation shall be enacted, persons enlisting or reenlisting on or after February 9, 1922, are not entitled to the benefit of this $100 allowance for burial expenses.

All officers and enlisted men of the Navy and Marine Corps are entitled to burial, with military honors, in the National Cemetery at Arlington, Va. (near Washington), or in any one of the national or naval cemeteries located at different points throughout the country, and when such interment is made no expense whatever devolves upon the relatives of the deceased. The graves in these cemeteries are marked with suitable headstones and are perpetually kept in perfect condition.

N63–EMT 573–17.

NAVY DEPARTMENT, BUREAU OF NAVIGATION,
Washington, D. C., 28 March, 1922.

BUREAU OF NAVIGATION CIRCULAR LETTER NO. 12–22.

To: All ships and stations.
Subject: Advancement in rating.
Reference: Articles D–4120 to D–4123, inclusive.
D–4100 to D–4102, inclusive.
D–4200 to D–4210.
Bureau of Navigation Manual.

1. It has become apparent that with the former and present methods of advancements in ratings, the bureau can not keep accurate control of the number of men in the various petty officer ratings, nor can it adjust the correct proportion in the various grades throughout the service, both of which have become very necessary with the present system of appropriation by Congress for the "Pay of the Navy." To this end the bureau will control all advancement of petty officers according to the needs of the service, and the above references will be considered in abeyance until further orders.

2. After a sufficient time has elapsed to judge the effects of this method on the service, and the amount of clerical work entailed, the bureau will request comment thereon from commanders in chief and other officers in authority, and will then decide whether to adopt some other method or to continue the procedure herein outlined. Commanding officers are directed to note in appropriate place such paragraphs of the Bureau of Navigation Manual as are placed in abeyance.

3. *Advancement in rating.*—The following procedure will be followed from date of receipt of this letter:

(*a*) Apprentice seamen will be advanced to seamen 2c prior to transfer from training stations.

(*b*) *Other lower ratings.*—Men to be considered qualified for advancement to the lower ratings (that is, other than petty officers' ratings, or officers' cooks

and stewards) must serve in the next lower rating, with an average of at least 3.5 each in proficiency in rating, sobriety, and obedience for six months. When qualified as above, commanding officers may advance men to *fill vacancies in complement* to ratings other than petty officers, or officers' cooks and stewards without reference to the bureau.

(*c*) *Petty officers.*—Men to be considered qualified for advancement to any petty officer rating or to officers' cooks and stewards must serve in the next lower rating, with an average of at least 3.5 each in proficiency in rating, sobriety, and obedience for at least one year. Men who are so qualified and who are considered good petty officer material may be recommended by name to the Bureau of Navigation for advancement. The bureau will notify the commanding officer of receipt of this recommendation and when vacancies exist will authorize advancement. No man will be advanced to a petty officer rating or to officers' cook or steward without authority from the Bureau of Navigation.

(*d*) *Chief petty officers.*—Petty officers, 1st class, will be advanced to chief petty officers by authority of the Bureau of Navigation as heretofore. Such men will not be recommended for advancement until they have served one year in their present grade with an average of 3.5 each in proficiency in rating, sobriety, and obedience. At least six months of said service in grade shall have been on seagoing vessels, in the field with the Marines beyond the continental limits of the United States, or, in the case of aviation ratings, with an operating air station or aviation detachment. Transcript of record on Form N, Nav. 21, and report of examination on Form N, Nav. 524, must accompany such recommendation.

(*e*) Commanding officers, upon receipt of information that men have been placed on the bureau's eligibility list for advancement in rating, should not subsequently request information from the bureau as to the standing of any individual. This is necessary in view of the shortage of clerical force in the bureau to answer such correspondence.

(*f*) All changes in ratings, except reduction, will be made on the first day of a calendar month.

(*g*) The bureau will consider advancement to the lowest petty officer rating in each branch of men who have not reached the highest nonrated grade. This applies particularly to graduates of trade schools.

(*h*) Ex-service men who have lost continuous service and men who have been disrated for any cause may be recommended for advancement to the Bureau of Navigation and will be handled as individual cases in accordance with the needs of the service and the record of the man concerned.

4. *Permanent appointments.*—Chief petty officers with acting appointments may be recommended to the Bureau of Navigation for permanent appointment after completion of one year's service in grade with an average of 3.5 each in proficiency in rating, sobriety, and obedience. At least six months of said service in grade shall have been on seagoing vessels, in the field with the Marines beyond the continental limits of the United States, or, in the case of aviation ratings, with an operating air station or aviation detachment. Transcript of record on Form N, Nav. 21, and report of examination on Form N, Nav. 524, must accompany such recommendation. No permanent appointments will be issued except by specific authority of the Bureau of Navigation.

5. Upon receipt of this letter Alnav 75, 1921, and 2, 1922, and all other instructions in so far as they pertain to the advancement of enlisted men will be considered canceled, or held in abeyance.

THOMAS WASHINGTON.

VITAL STATISTICS.

In the future the "Monthly Health Index," which will be published on the fifteenth of each month, will contain statistical data for individual ships and shore stations. The statistics appearing in this Bulletin are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{365}{28}$ or $\frac{365}{35}$ or 12, depending upon whether the period includes four of five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the four-week period Mar. 5 to Apr. 1, 1922, inclusive.*

	Average complement.	All causes.		Diseases only.		Accidents and injuries.	
		Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Entire Navy	127,050	6,604	675.72	6,039	617.91	565	57.81
Forces afloat	91,268	3,821	544.22	3,490	497.18	331	47.14
Atlantic Fleet	39,937	732	238.27	487	158.57	88	28.64
Pacific Fleet	38,804	955	319.93	701	234.89	94	31.49
Forces ashore	35,782	1,727	627.44	.....	.....	.....	.....
Atlantic stations [1]	26,601	1,332	650.95	.....	.....	.....	.....
Pacific stations	7,135	244	444.57	.....	.....	.....	.....
U. S. Marine Corps	21,890	1,379	818.95	1,255	687.99	124	67.98

	Average complement.	Communicable diseases exclusive of venereal disease.		Venereal disease.	
		Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Entire Navy	127,050	3,272	390.43	1,153	117.97
Forces afloat	91,268	2,031	289.28	729	103.83
Atlantic Fleet	39,937	657	213.86	157	51.11
Pacific Fleet	38,804	1,254	420.10	160	53.60
Forces ashore	35,782	294	106.81	243	88.23
Atlantic stations [1]	26,601	202	98.72	201	98.23
Pacific stations	7,135	24	43.73	21	38.26
U. S. Marine Corps	21,890	628	344.27	287	170.44

[1] Does not include eighth and ninth naval districts.

NOTE.—Asiatic and unassigned ships not reported.

TABLE No. 2.—*Number of admissions reported by Form F cards for the most important diseases of the digestive system, respiratory systems, and hernia, with the annual admission rates per 1,000, for the 4-week period Mar. 5 to Apr. 1, 1922, inclusive.*

	Forces afloat (complement), 91,268.		Forces ashore (complement), 35,782.		Total (complement), 127,050.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 3.						
Appendicitis, acute	59	7.76	34	11.40	93	8.78
Autointoxication (intestinal)	10	1.31	10	3.35	20	1.89
Cholangitis, acute	18	2.37	12	4.02	30	2.83
Cholecystitis, acute	7	.92	1	.34	8	.76
Colitis, acute	0	0	3	1.01	3	.28
Constipation	8	1.05	22	7.38	30	2.83
Enteritis, acute	13	1.71	12	4.02	25	2.36
Gastritis, acute	5	.66	2	.67	7	.66
Gastroenteritis	16	2.10	23	7.71	39	3.68
Pharyngitis, acute	16	2.10	37	12.41	53	5.01
Ulcers, gastrointestinal	2	.26	6	2.01	8	.76
Total	154	20.25	162	54.33	316	29.85
Class 18.						
Bronchitis, acute	209	27.48	249	83.60	458	43.26
Laryngitis, acute	3	.39	8	2.68	11	1.04
Pleurisy, acute fibrinous	3	.39	8	2.68	11	1.04
Rhinitis, acute	23	3.02	14	4.70	37	3.49
Tonsillitis, acute follicular	302	39.71	307	102.96	609	57.52
Total	540	71.00	586	196.52	1,126	106.35
Class 20.						
Hernia	35	4.60	22	7.38	57	5.38

TABLE No. 3.—*Number of admissions reported by Form F cards for certain communicable diseases and annual rates per 1,000 for the 4-week period Mar. 5 to Apr. 1, 1922, inclusive.*

	Navy (complement), 105,160.		Marine Corps (complement), 21,890.		Total (complement), 127,050.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Class 8.						
Chickenpox	4	0.49	3	1.78	7	0.72
Diphtheria	2	.25	1	.59	3	.31
German measles	32	3.96	1	.59	33	3.38
Influenza	1,345	166.27	166	98.58	1,511	154.61
Measles	4	.49	1	.59	5	.51
Mumps	7	.87	3	1.78	10	1.02
Pneumonia, broncho	15	1.85	1	.59	16	1.64
Pneumonia, lobar	14	1.73	2	1.19	16	1.64
Scarlet fever	6	.74	0	0	6	.61
Smallpox	1	.12	5	2.97	6	.61
Class 9.						
Dysentery, bacillary	0	.....	1	.59	1	.10
Dysentery, entamebic	1	.12	0	0	1	.10
Class 10.						
Dengue	18	2.23	28	16.63	46	4.71
Malaria	30	4.94	125	74.23	155	15.86
Filariasis	2	.25	0	.....	2	.20
Class 11.						
Tuberculosis (all forms)	18	2.23	4	2.38	22	2.25
Class 12.						
Chancroid infection	185	22.87	93	55.23	278	28.44
Gonococcus infection	588	72.69	164	97.39	752	76.94
Syphilis	93	11.50	30	17.82	123	12.59
Total	2,365	292.36	628	372.95	2,993	306.24

TABLE NO. 4.—*Summary of annual admission rates for venereal disease reported from ships for February and from various shore stations for the four-week period, Mar. 5 to Apr. 1, 1922, inclusive.*

	Annual rate per 1,000, February.			Average rate since Jan. 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	0	99.40	1,056.99	0	133.39	1,081.08
Battleship and cruiser force:						
Atlantic Fleet	0	77.42	568.42	0	114.84	369.23
Pacific Fleet	27.62	87.07	181.01	59.78	98.66	169.31
Asiatic Fleet	38.58	94.32	115.10	112.50	185.17	312.00
Destroyer force:						
Atlantic Fleet	0	137.74	813.55	0	167.85	1,081.08
Pacific Fleet	0	70.72	800.00	0	103.86	588.23
Asiatic Fleet	126.31	305.73	383.56	63.49	305.96	1,003.92
Miscellaneous:						
Atlantic Fleet	0	97.09	615.38	0	138.43	571.42
Pacific Fleet	0	44.52	292.68	0	82.56	400.00
Asiatic Fleet	0	369.23	1,056.99	0	359.79	1,000.00
Unassigned, including ships on special duty	0	141.64	423.52	0	164.22	753.92

	Annual rate per 1,000, Mar. 5–Apr. 1, 1922.			Average rate since Jan. 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States	0	101.87	433.99	0	98.41	400.75
First naval district	16.92	54.74	244.36	7.60	46.84	179.10
Third naval district	0	74.52	157.20	7.04	74.04	134.94
Fourth naval district	0	239.85	315.94	0	230.86	279.50
Fifth naval district	0	137.69	433.99	0	131.17	154.59
Sixth naval district	58.03	76.03	252.91	39.06	54.59	136.36
Seventh naval district	78.78	78.78	78.78	39.39	39.39	39.39
Eighth naval district	79.65	99.37	259.99	119.84	168.18	400.75
Ninth naval district	156.48	156.48	156.48	82.19	82.19	82.19
Eleventh naval district	0	18.78	44.57	10.95	26.97	49.88
Twelfth naval district	42.10	64.81	109.81	62.13	89.77	114.51
Thirteenth naval district	0	13.34	28.50	25.53	51.88	118.91

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, February.		Per cent since Jan. 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	66.72	13.60	66.66	10.86
Battleship and cruiser force:				
Atlantic Fleet	60.31	15.87	71.35	8.25
Pacific Fleet	80.00	17.00	79.32	12.98
Asiatic Fleet	100.00	0	60.97	24.39
Destroyer force:				
Atlantic Fleet	65.62	3.12	63.92	6.64
Pacific Fleet	75.00	11.53	74.83	7.74
Asiatic Fleet	50.00	50.00	42.64	14.70
Miscellaneous:				
Atlantic Fleet	57.53	27.39	67.15	13.72
Pacific Fleet	82.60	4.34	77.89	8.42
Asiatic Fleet	55.26	18.42	46.66	15.23
Unassigned, including ships on special duty	54.00	10.00	55.85	13.51

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE—Continued.

	Per cent, Mar. 5–Apr. 1, 1922.		Per cent since Jan. 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States	67.08	15.23	66.44	16.78
First naval district	71.42	21.43	76.31	15.77
Third naval district	47.61	52.38	63.33	28.57
Fourth naval district	85.29	2.94	76.08	5.43
Fifth naval district	62.71	7.77	60.91	13.68
Sixth naval district	69.20	23.07	80.00	13.33
Seventh naval district	100.00	0	100.00	0
Eighth naval district	62.50	25.00	72.50	22.50
Ninth naval district	84.62	15.48	75.00	17.85
Eleventh naval district	66.66	33.33	64.28	21.42
Twelfth naval district	70.58	23.52	58.33	33.33
Thirteenth naval district	0	100.00	90.99	9.01

TABLE No. 5.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the four-week period, Mar. 5 to Apr. 1, 1922, inclusive.*

	Navy (complement), 105,160.		Marine Corps (complement), 21,890.		Total (complement), 127,050.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of blood	1	0.12	1	0.59	2	0.20
Diseases of circulatory system	21	2.60	7	4.16	28	2.86
Diseases of digestive system	435	53.77	133	78.98	568	58.12
Diseases of ductless glands and spleen	0	0	1	.59	1	.10
Diseases of ear	88	10.88	16	9.50	104	10.64
Diseases of eye and adnexa	53	6.55	13	7.72	66	6.75
Diseases of genito-urinary system (non-venereal)	139	17.18	27	16.03	166	16.99
Communicable diseases transmissible by oral and nasal discharges	1,430	176.78	183	108.68	1,613	165.04
Communicable diseases transmissible by intestinal discharges	1	.12	1	.59	2	.20
Communicable diseases transmissible by insects and other arthropods	50	6.18	153	90.86	203	20.77
Tuberculosis (all forms)	18	2.23	4	2.38	22	2.25
Venereal diseases	866	107.05	287	170.44	1,153	117.97
Other diseases of infective type	220	27.20	76	45.13	296	30.29
Diseases of lymphatic system	49	6.06	15	8.91	64	6.55
Diseases of mind	15	1.85	6	3.56	21	2.15
Diseases of motor system	63	7.79	30	17.82	93	9.52
Diseases of nervous system	35	4.33	9	5.34	44	4.50
Diseases of respiratory system	1,037	128.19	210	124.71	1,247	127.59
Diseases of skin, hair, and nails	66	8.16	23	13.66	89	9.11
Hernia	47	5.81	7	4.16	54	5.53
Miscellaneous diseases and conditions	67	8.28	15	8.91	82	8.39
Parasites (fungi and certain animal parasites)	77	9.52	35	20.79	112	11.46
Tumors	6	.74	3	1.78	9	.92
Injuries	422	52.17	110	65.33	532	54.43
Poisons	19	2.35	14	8.31	33	3.38
Total	5,225	645.91	1,379	818.95	6,601	675.72

TABLE No. 6.—*Deaths reported, entire Navy, for the four-week period, Mar. 5 to Apr. 1, 1922, inclusive.*

Causes.	Navy (complement), 105,160.	Marine Corps (complement), 21,890.	Total (complement), 127,050.
Influenza (pneumonia)	1	0	1
Influenza	2	0	2
Pneumonia, lobar	1	1	2
Tuberculosis, chronic pulmonary	2	0	2
Malignant growths	1	0	1
Other diseases	9	3	12
Drowning	3	1	4
Accidents and injuries	7	1	8
Poisons	1	0	1
Total	27	6	33
Annual death rate per 1,000, all causes	3.35	3.56	3.38
Annual death rate per 1,000, disease only	1.98	2.38	2.05

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UNITED STATES NAVAL MEDICAL BULLETIN

PUBLISHED FOR THE

INFORMATION OF THE MEDICAL DEPARTMENT OF THE SERVICE

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DIVISION OF INSTRUCTION AND PUBLICATIONS
COMMANDER H. W. SMITH, MEDICAL CORPS, U. S. NAVY
IN CHARGE

EDITED BY
LIEUTENANT COMMANDER W. M. KERR
MEDICAL CORPS, U. S. NAVY

JUNE, 1922
(MONTHLY)

Compiled and published under authority of Naval Appropriation Act for 1922, approved July 12, 1921

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NAVY DEPARTMENT,
Washington, March 20, 1907.

This UNITED STATES NAVAL MEDICAL BULLETIN is published by direction of the department for the timely information of the Medical and Hospital Corps of the Navy.

TRUMAN H. NEWBERRY,
Acting Secretary.

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TABLE OF CONTENTS.

Page.

PREFACE v

NOTICE TO SERVICE CONTRIBUTORS vi

SPECIAL ARTICLES:

HYDROGEN-ION CONCENTRATION.

By Lieutenant Commander C. W. O. Bunker, Medical Corps, U. S. N. 973

AVIATION MEDICINE IN THE UNITED STATES NAVY.

By Lieutenant J. F. Neuberger, Medical Corps, U. S. N. 983

DEVELOPMENTS IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS.

By Lieutenant L. W. Shaffer, Medical Corps, U. S. N. 1011

HISTORICAL:

THE OLD ANATOMICAL SCHOOL AT PADUA.

By Lieutenant Commander W. M. Kerr, Medical Corps, U. S. N. 1015

EDITORIAL:

ON CARBON MONOXIDE ASPHYXIA.—ON THE HABIT OF READING 1029

SUGGESTED DEVICES:

THE METHOD OF PREPARING COLLOIDAL GOLD SOLUTION USED AT THE U. S. NAVAL MEDICAL SCHOOL.

By Lieutenant J. Harper, Medical Corps, U. S. N., and Chief Pharmacist C. Schaffer, Medical Corps, U. S. N. 1037

PROGRESS IN MEDICAL SCIENCES:

GENERAL MEDICINE.—Prognostic significance of persistent high blood pressure.—Standardization of the Wassermann reaction.—Modern conceptions of the treatment of syphilis.—Treatment of neurosyphilis.—Treatment of visceral syphilis.—New technique for staining Treponema pallida.—Method of demonstration of spirochæta pallida in the tissues 1041

SURGERY.—Postoperative pulmonary complications 1051

TROPICAL MEDICINE.—Activities of infective hookworm larvæ in the soil.—Use of carbon tetrachlorid for removal of hookworms.—Hemotoxins from parasitic worms.—Specific treatment of malaria.—Malaria epidemic in Naras in 1918.—Dysentery.—Une nouvelle maladie a bacilles acido-résistants qui n'est ni la tuberculose, ni la lèpre.—Malaria epidemic caused by M. Sinensis.—Vesical bilharziasis, indigenous to Portugal.—An exceptional tropical ulceration 1053

PHYSIOLOGICAL CHEMISTRY.—Action of antispasmodic drugs on the bronchus.—Methanol on trial.—Nature of beriberi and related diseases.—Ethyl alcohol, caffeine, and nicotine on the behavior of rats in a maze.—Biliary obstruction required to produce jaundice.—Transfused blood.—Anthelmintics and hookworm treatment.—Chemotherapy.—Influence of morphine in experimental septicemia.—Fumigation with formaldehyde.—Lesions in bones of rats suffering from uncomplicated berberi 1062

EYE, EAR, NOSE, AND THROAT.—Nose, throat, and ear requirements of airmen.—Septicemia and death following streptococcus tonsillitis.—Gangosa.—Iritis caused by focal infection.—Episcleritis .. 1065

NOTES AND COMMENTS:

Toxic effects of picric acid.—Chemical warfare.—Destruction of the dirigible ZR-2.—Outbreaks of plague in South Africa.—Relation of species of rat fleas to the spread of plague.—Diary of William Clift.—Medicine in art.—Therapeutic index of silver arsphenamin.—Antiscorbutic vitamins contained in dehydrated fruits.—Hookworm survey.—Treatment of amoebic dysentery 1071

REPORTS:

Report of the health of the Royal Air Force for the year 1920. 1085

NURSE CORPS 1095

DIGEST OF DECISIONS 1099

BOOK NOTICES 1103

QUERIES 1111

PREVENTIVE MEDICINE STATISTICS, LETTERS, ORDERS 1115

INDEX I

PREFACE.

The United States Naval Medical Bulletin was first issued in April, 1907, as a means of supplying medical officers of the United States Navy with information regarding the advances which are continually being made in the medical sciences, and as a medium for the publication of accounts of special researches, observations, or experiences of individual medical officers.

It is the aim of the Bureau of Medicine and Surgery to furnish in each issue special articles relating to naval medicine, descriptions of suggested devices, clinical notes on interesting cases, abstracts of current medical literature of special professional interest to the naval medical officer, reports from various sources, historical essays, notes and comments on topics of medical interest, and reviews or notices of the latest published medical books.

The bureau extends an invitation to all medical officers to prepare and forward, with a view to publication, contributions on subjects of interest to naval medical officers.

In order that each service contributor may receive due credit for his efforts in preparing matter for the Bulletin of distinct originality and special merit, the Surgeon General of the Navy will recommend that a letter of commendation be forwarded to him upon the acceptance of his manuscript for publication, and that a copy of this letter be attached to his official record.

The bureau does not necessarily undertake to indorse all views or opinions which may be expressed in the pages of this publication.

E. R. Stitt,
Surgeon General United States Navy.

NOTICE TO SERVICE CONTRIBUTORS.

When contributions are typewritten, *double spacing* and wide margins are desirable. Fasteners which can not be removed without tearing the paper are an abomination. A large proportion of the articles submitted have an official form such as letterheads, numbered paragraphs, and needless spacing between paragraphs, all of which require correction before going to press. The BULLETIN endeavors to follow a uniform style in headings and captions, and the editor can be spared much time and trouble and unnecessary errors can be obviated if authors will follow in the above particulars the practice of recent issues. This is not only important in special articles, but still more so in reviews.

The greatest accuracy and fullness should be employed in all citations, as it has sometimes been necessary to decline articles otherwise desirable because it was impossible for the editor to understand or verify references, quotations, etc. The frequency of gross errors in orthography in many contributions is conclusive evidence that authors often fail to read over their manuscripts after they have been typewritten.

Contributions must be received two months prior to the date of the issue for which they are intended.

The editor is not responsible for the safe return of manuscripts and pictures. All materials supplied for illustrations, if not original, should be accompanied by a reference to the source and a statement as to whether or not reproduction has been authorized.

Only the names of actual reviewers for a current number appear.

The BULLETIN intends to print *only original articles, translations, in whole or in part, reviews, and reports and notices of Government or departmental activities, official announcements, etc. All original contributions are accepted on the assumption that they have not appeared previously and are not to be reprinted elsewhere without an understanding to that effect.*

U. S. NAVAL MEDICAL BULLETIN

VOL. XVI. JUNE, 1922. No. 6.

SPECIAL ARTICLES.

HYDROGEN-ION CONCENTRATION.

By C. W. O. BUNKER, Lieutenant Commander, Medical Corps, United States Navy.

Researches conducted during the past decade have revealed the importance in the many phases of the activities of medical men of one of the phenomena of physical chemistry, viz, that of ionization. This importance will be further discussed at the end of this article. It is unfortunate that the usual presentation of this subject as encountered by us is either too cursory to give any real satisfaction, or it is too technical for our special training. For this elementary résumé I have drawn freely upon Clark (Clark, W. M. The Determination of Hydrogen Ions. Williams & Wilkins Co., Baltimore: 1920), whose book is a most excellent presentation of the subject.

We are all aware of the fact that an electric current passed under proper conditions through a solution of a metallic salt will cause a deposition of the metal at one electrode or pole. This phenomenon, known as electrolysis, is the basis of the familiar process of electroplating and is merely a special manifestation of ionization. The portion of the salt from which the metal has been detached travels to the other pole. Thus, the salt has been decomposed into two portions, or ions—one, the metal or cation, bearing a positive charge of electricity and going to the negative pole, while the other, or anion, bears a negative charge and collects at the positive pole.

For this separation into ions, however, an electric current is not a necessity. The molecules of a large number of chemical compounds partially dissociate into ions upon being placed in solution, and one ion will carry a charge of positive while the other carries one of negative electricity. The condition of a compound in solution

may be indicated as follows, the solvent being ignored and the nature of the electrical charge being shown by the + or − exponent:

$$HCl \rightleftharpoons H^+ + Cl^-$$
$$NaOH \rightleftharpoons Na^+ + OH^-$$
$$H_2O \rightleftharpoons H^+ + OH^-$$
$$CH_3COOH \rightleftharpoons H^+ + CH_3COO^-$$
$$NaCl \rightleftharpoons Na^+ + Cl^-$$

In other words, the solution contains the original compound in undissociated form and also dissociated partially into its ions; the process is reversible, and if the equilibrium be suitably disturbed the ions may reassociate into the original compound, or there may be a further dissociation.

The extent of this dissociation into ions depends upon many factors, such as the nature of the compound, the nature of the solvent, the temperature, the degree of dilution, etc. Under definite conditions, the degree of dissociation is constant. Hydrochloric acid and acetic acid will serve to illustrate the difference as between compounds. In 0.1N aqueous solution at 18° C. the former is dissociated to the extent of 84 per cent, while the latter is dissociated only 1.36 per cent.

Concentration is a common chemical term and means the weight (in grams) of the substance per liter of solution. In the present connection the term is used with regard not only to the original compound placed in solution but also to the portion that remains undissociated in the solution. Furthermore, the results of dissociation, the ions, are definite forms of matter, have weight, and are present in definite concentration. Consequently, by *hydrogen-ion* (or hydrion) *concentration*, we mean the weight of hydrogen in ionic form, H^+, present in a liter of solution. Similarly we may describe the concentration of any other ion, such, for instance, as the hydroxyl ion (hydroxidion), OH^-. Concentration is indicated graphically by placing the symbol in brackets ([HCl], [H^+], etc.), or by the use of an abbreviation for concentration (C_{H^+}, etc.), or by indicating the normality (0.1N, N/10, etc.).

We are all familiar with the process of titration of an acid with a base, and vice versa, in order to determine strength. The formula for the acid being known, we have thus also determined the amount of hydrogen present or of any other of the component elements or radicles, inasmuch as these are a definite proportion of the whole. We have thus determined the acidity by measuring all the hydrogen, providing the proper indicator has been employed. As regards the hydrogen-ion concentration, the information obtained does not necessarily establish its value. The titration value is important from the standpoint of ability to neutralize base, or total value in a chemical

reaction; the hydrogen-ion concentration is the important value from the biological point of view, that of living cells exhibiting their vital phenomena, etc. We are thus confronted with *two aspects of acidity*, the one considering the total available hydrogen and the other the amount of hydrogen in ionic form. The former, of course, includes the latter, and, in the process of titration as in other chemical reactions, it is considered that the neutralization or reaction occurs between the ions, the undissociated molecules being inactive. The reaction can become complete, due to the fact that, as the ions react and partially pass into the undissociated form of the new compound, the equilibrium is disturbed and there is further dissociation, resulting in more ions.

I have stated above that, under definite conditions, the degree of dissociation of a compound in solution is constant. Therefore, a constant value can be assigned to the phenomenon, and we have what is known as the *dissociation constant*, or K. As an example, the dissociation of hydrochloric acid in solution may be indicated as

$$K\,[HCl] = [H^+] \times [Cl^-]$$

or,

$$K = \frac{[H^+] \times [Cl^-]}{[HCl]}$$

Now let us dissolve in the solution of HCl some other compound that, in solution, will form hydrogen ion by itself dissociating, e. g., nitric acid, which would partially dissociate into H^+ and NO^-_3. We have thus increased the total concentration of hydrogen ions ($[H^+]$) in the solution but not that of chlorine ions ($[Cl^-]$). The hydrogen ions from the HNO_3 are just as effective as regards the HCl equilibrium as are the hydrogen ions from the HCl itself. Consequently, in order that the value of K may be maintained, hydrogen ions will reassociate with chlorine ions until equilibrium is again restored, and it will then be found that the result, as regards the dissociation of the HCl, has been an increase in $[H^+]$ and [HCl], and a decrease in $[Cl^-]$. The same line of reasoning applies to other compounds.

The consideration of acids and bases involves the question of *neutrality*. Passing from an acid to an alkaline condition, or the reverse, the solution must pass through a neutral point or state, i. e., a point at which the factors making for acidity are balanced by those tending to produce alkalinity. The acid properties of a solution are due to the hydrogen ion, and basic properties to hydroxyl ion. So, at the neutral point, hydrion must balance hydroxidion, i. e., be present in equal numbers. This condition obtains in water, since its dissociation is represented by

$$H_2O \rightleftharpoons H^+ + OH^-$$

Like the HCl considered above, water has its dissociation constant (known as K_w), and the facts are thus indicated:

$$K[HOH]=[H^+]\times[OH^-]$$

So few molecules of water, however, are dissociated that, to all intents and purposes, [HOH] is a constant, and we may write the equation thus:

$$K_w=[H^+]\times[OH^-]$$

Experiments with the purest water obtainable have shown that K_w is very small, having a value of 1.04×10^{-14} at 25° C. The H and the OH have been calculated, and, for our purposes, each may be considered to be 1.0×10^{-7} *normal* at 21° C. In other words, the actual weight of hydrion present per liter is 0.000,000,1 gram, and it is balanced by an *equivalent* (not an equal) weight of hydroxidion.

A few words relative to negative exponents and other details connected with this subject may be helpful here. The following list should make clear the significance of exponents:

$$\begin{aligned}10^2&=100\\10^1&=10\\10^0&=1\\10^{-1}&=0.1\\10^{-2}&=0.01\\0.5\times10^{-2}&=0.005\\1.5\times10^{-3}&=0.0015\\10^{-10}&=0.000,000,000,1\end{aligned}$$

Now, such an amount as the last given is not unusual in this connection. It is clumsy to handle, and such amounts are unsatisfactory for purposes of charting, or plotting. It might be abbreviated to 0.0^91, but, in this work it is customary to consider the *potential of the hydrogen-ion concentration* rather than the hydrogen-ion concentration itself. This potential is properly abbreviated to p_H, but it is usually written as pH, and even as Ph or P_H. I will use pH by reason of its convenience. pH is a logarithmic derivative of C_{H^+} (hydrogen-ion concentration), being the Briggs (denary, or decimal) logarithm of the reciprocal of the hydrogen-ion concentration. The following will illustrate its derivation:

Let $C_{H^+}=0.001$ (or 10^{-3}, or 1.0×10^{-3}, or 0.0^21)

Then, reciprocal of $C_{H^+}=\frac{1}{0.001}=1000$

And, $pH=\log 1000=3.0$

It will be seen from the preceding that the pH of pure water is 7.0, since the C_H is 10^{-7}, and this pH is considered that of neutrality. It is also evident that, as the hydrogen-ion concentration increases

ne pH decreases, and vice versa. So, a pH of less than 7.0 is considered an acid solution, and one of more than 7.0 an alkaline solution. Furthermore, the degree of acidity or alkalinity varies directly with the extent of the departure of the pH from that of 7.0. This neutral point, however, to which we assign a C_H^+ value of 10^{-7}N, is more a subject of speculative than of practical interest. It merely establishes a point beyond which on the one side the hydrogen ions are in excess of the hydroxyl ions, and on the other side of which the reverse is the case. Its relation to various phenomena is similar in mechanism to that of points having other C_H^+ values, and, as a matter of fact, the dissociation of some weak acids gives hydrogen-ion concentrations upon the alkaline side of 10^{-7}N. Furthermore, even in titrations, the C_H^+ at exact neutralization is not necessarily that of 10^{-7}N.

The solutions ordinarily employed in this work are aqueous. The discussion above relative to the effect of added ions upon HCl in solution applies with equal force to water. The solution of an acid in water adds hydrogen ion, thereby diminishing the hydroxyl ion. The solution of a base, such as NaOH, in water increases the hydroxyl ion and diminishes the hydrogen ion. As the hydrion increases the hydroxidion decreases, and vice versa, and the acid and basic factors are thus seen to bear a definite relation to each other. But, being an aqueous solution, there is always some dissociation of the water, and aqueous acid solutions contain some hydroxion just as aqueous alkaline solutions contain hydrogen ion. It has become customary, for the sake of convenience, to consider only the hydrogen ion, even alkaline solutions being described in terms of hydrogen-ion concentration.

The following list may be of interest, showing, as it does, the approximate pH of several fluids frequently encountered:

	0.1N HCl	1.08
Acid	Gastric juice (adult)	0.9–1.6
	0.1N CH_3COOH	2.87
	0.001N HCl	3.01
	0.001N CH_3COOH	3.87
	Gastric juice (infants)	5.0
	Urine	6.0
	Milk (cow)	6.7
	Saliva	6.9
Neutral	Pure water	7.0
Alkaline	Milk (human)	7.1
	Blood	7.4
	Pancreatic juice	8.3
	0.1N NaOH	13.2

The list is suggestive in that, for the body and biological fluids mentioned, the pH lies to the acid side of neutrality or slightly to the

alkaline side. The optimum reaction for media for various bacteria also lies close to neutrality, extending probably more to the acid than to the alkaline side. So, it is not surprising to find biological literature in this regard devoted essentially to this region of pH. Values more alkaline than 9.0 are unusual, and methods for the determination of such do not receive much emphasis.

If one takes an aqueous solution of a strong acid and adds alkali to it, or vice versa, it will be found that the pH has been markedly changed. There are, however, many substances which, when present in solution, tend to nullify the effect of such added acid or alkali to an extent such that relatively much must be added before the pH is appreciably disturbed. Such substances are called *buffers*. One can explain their action, and practically any textbook covering this subject will do so, but I believe such explanation might be confusing in such an elementary résumé as this is intended to be. Protein, bicarbonates, phosphates, etc., are the buffers of the body fluids, and it is due to their presence that the constancy of pH is maintained despite invading acids or alkalis.

Furthermore, it has been shown that moderate dilution (five to ten times) has no effect of moment upon the pH of many fluids, especially solutions of weak acids with their salts. As a large number of fluids, including those of the body, are of such a nature, the fact is important, particularly when they are turbid or colored and it becomes necessary to determine their pH colorimetrically.

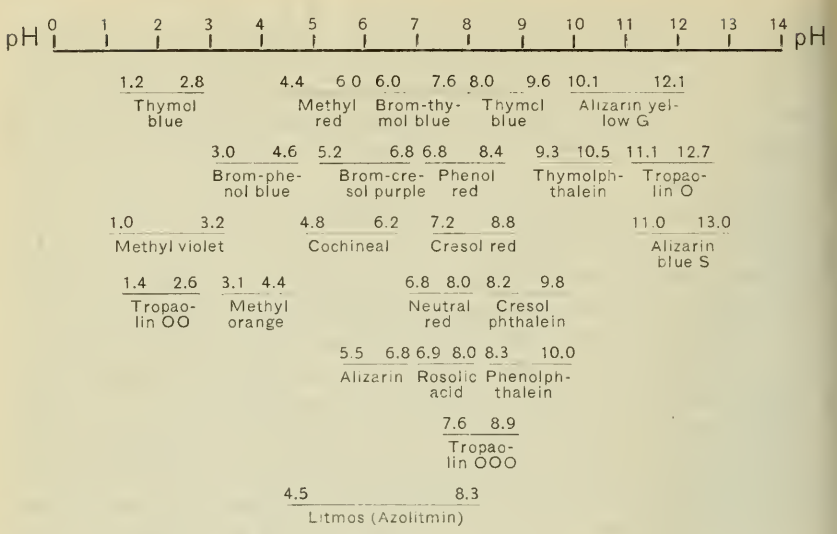
Two methods are employed for the measurement of pH. The *electrometric method* involves determination of the conductance of the solution. Expensive and delicate apparatus is required, so that it is not generally available. It is, however, the basis for this work, and necessary if an accurate check is desired upon the other method. The *colorimetric method* is simple and well adapted to the capabilities of most laboratories. It involves the use of indicators and buffers, and the technique is amply considered for our ends in any up-to-date textbook, so I will not enter upon that phase in this article. It should, however, be mentioned that cleanliness and precision are prime requisites in this work. Ordinary distilled water is not of sufficient purity—the carbon dioxide must be removed.

The buffer solutions employed in colorimetric work consist of mixtures of solutions of chemical compounds. These solutions are of exact strength, and those of acid nature are mixed with those of more basic nature in definite proportions. Under such circumstances, the resulting mixture will have a definite hydrogen-ion concentration, or pH value. Textbooks will give the composition of such buffer solutions, as well as directions for the preparation of mixtures having pH values ranging from 1.0 to 13.0. The chemicals must be pure. They may be purified or prepared in the average

laboratory, if care is employed and the directions closely followed. They are, however, now readily purchasable of satisfactory quality for this work, and it will usually be found preferable to so secure them. But remember that the only real check upon the accuracy of a buffer mixture is the determination of the pH by the electrometric method.

Medical men are familiar with indicators, at least to the extent of litmus and phenolphthalein. We all know that they evidence different colors depending upon whether they are exposed to acids or to alkalis. In the customary titrations of the laboratory, we note this color change, and, having added acid to base or base to acid, say that the change denotes neutralization. With strong solutions, such as normal or stronger, this change of color is sudden and complete. If the strength of the solution be diminished, say to N/20, we may observe a more gradual change. Further weakening, e. g., to N/1000, would demonstrate the fact that the change can be very gradual, and one or more c. c. may be necessary to obtain the complete color change that will be given by one drop of normal strength. The color change covers a definite series of tints. Moreover, using a variety of indicators, it will be noticed that, even with the same strength of solutions, some will evidence a more gradual change than others. And, finally, it will be found that, using weaker solutions, the titration values will not be the same with all indicators, although they did seem to be the same when normal strengths were employed. Measuring alkali in terms of acid, less acid will be required, for instance, to neutralize the alkali if the indicator be methyl orange than if phenophthalein be utilized.

All this is readily understood when one realizes that the color change depends upon the effect of the hydrion (or of its complement, the hydroxidion) upon the indicator. And, furthermore, that an appreciable change in hydrogen-ion concentration is necessary before there is complete transition between the extreme shades. And, lastly, that the particular pH at which the color change is produced varies with the indicator. This may be illustrated by plotting a pH scale that ranges from acidity through neutrality into alkalinity, and drawing against it the various indicators in such a manner as to show the pH range through which the color change of each is manifest.



Several facts of interest will be noted, viz, the large number of useful indicators in the region of the neutral point, 7.0; the wide range of litmus, which gives a poor end-point and limits its usefulness for purposes of exact titration; and the fact that one indicator (thymol blue) shows a color change in two regions. If strong solutions be used in titration, a single drop contains enough ions to complete the color change, i. e., to change the pH through a range much wider than that covered by the indicator. Weaker solutions, however, effect a gradual change in hydrogen-ion concentration, and thus the indicator can manifest all the tints in its range. Moreover, it is evident why less added acid will be required to complete the color change of such an indicator as methyl orange than of such another as phenolphthalein (the reverse being the case with added alkali).

Other considerations arise in the use and choice of indicators—factors that tend to limit their usefulness. From the standpoint of volumetric analysis these factors are many. As regards to colorimetric determination of hydrogen-ion concentration I will mention one that is very important, namely, that of "salt and protein errors," which means that these substances in the solution with the indicator may cause precipitates or may cause a decided variation between values determined electrometrically and those determined colorimetrically.

Indicators have been the subject of much investigation during the past 15 years. Clark and Lubs considered especially the sulphonephthalein indicators, and the result of their labors has been the recommendation of the following list as very well suited for this work.

	pH range.	Color change.	
		Acid.	Alkaline.
Thymol blue	1.2–2.8	Red	Yellow.
Brom-phenol blue	3.0–4.6	Yellow	Blue.
Methyl red	4.4–6.0	Red	Yellow.
Brom-cresol purple	5.2–6.8	Yellow	Purple.
Brom-thymol blue	6.0–7.6	do	Blue.
Phenol red (phenol-sulphonephthalein)	6.8–8.4	do	Red.
Cresol red	7.2–8.8	do	Do.
Thymol blue	8.0–9.6	do	Blue.
Cresol phthalein	8.2–9.8	Colorless	Red.

The net result is that one can readily prepare a set of standards, and then determine the pH of a solution by comparison with this set. One has only to prepare the buffer mixtures of definite pH mentioned previously, add the indicator to them and to the unknown, and compare the unknown with the standards until a match for its tint is found. This is the essence of the colorimetric method, and details of technique are easily to be found elsewhere. Moreover, having such a set of standards, the unknown solution can be adjusted to any desired pH by the cautious addition of weak acid or alkali until tints are matched. The question will arise as to what series of pH values should be prepared for standards, so as to decrease labor by avoiding the preparation of those that would be unnecessary. This is readily settled by testing the unknown systematically with various indicators. The range of pH covering their color change is known (see tabulations above), so one will finally encounter two indicators to one of which the solution will be acid and to the other of which it will be alkaline, or with one indicator it will evince neither the full acid nor the full alkaline tint. Thereby, the approximate pH is determined, and but little further effort will be required to determine it exactly, using a set of standards.

The importance of this subject from the standpoint of the medical man lies in the fact that hydrogen ion is a dissociation product of the great majority of compounds of biochemical importance, and that "*living cells are dependent upon the maintainance of a strictly limited hydrogen ion concentration in their environment*" (Clark, ibid, p. 218) *for the normal performance of their functions*. Moreover, the activity of enzymes and the processes of fermentation are intimately associated with the local hydrogen-ion concentration.

I will discuss below more fully the relation of hydrogen-ion concentration to activities associated with the medical sciences. Here, it is well to emphasize its significance and value in connection with more purely scientific or industrial pursuits, and note the fact that

determinations of the nature of those that have been here outlined are steadily assuming increasing importance as their value is understood. The hydrogen-ion concentration is intimately concerned in chemistry with analytical processes involving qualitative color reactions, titrations, colloids (filtration), solubilities, crystallography, catalysis, and cataphoresis. Natural plant distribution is correlated with the pH of the soil, and much valuable work is being done along this line. Plant and animal distribution in water has also been shown to be related to the hydrogen-ion concentration of the water. Industries must now consider this matter if they pretend to be efficient, notably those of electroplating and tanning, and those concerned with the manufacture or handling of bread, cheese, canned foods, milk, wine, beer, vinegar, etc.

Probably closer to us comes the behavior of bacteria and enzymes in the face of varying hydrogen-ion concentrations. We have learned that each organism or ferment has an optimum pH—for growth and general metabolism in the case of the former, and for activity in the case of the latter. The permissible latitude of variation before life or activity is destroyed varies in each case, between wide limits for some and very narrow ones for others. Consequently, we now endeavor to supply a concentration of hydrogen-ions in the media that is desirable for our purposes. Recent literature has practically discarded the older system of adjustment of media and has substituted that of pH values, and one can not intelligently follow modern bacteriological procedure without a knowledge of this subject. Hydrogen-ion concentration is intimately associated with the questions of disinfectant action (with the same concentration of disinfectant, a change in pH of only 1.0 may destroy the bactericidal power), that of acid agglutination of bacteria, determination of species, and the commercial side of bacteriology dealing with the specific bacterial products, such as diphtheria toxin. And it is scarcely necessary to mention enzyme action in the human body, involving, as it does, digestion, autolysis of tissue, and so many of the internal functions.

Hydrogen-ion concentration has been investigated relative to the excretions, such as urine, sweat, feces, etc., the digestive juices, cerebrospinal fluid, serous fluids, blood, etc. It is involved in the questions of hemolysis, and the very important one of acidosis. The matter of acid-base equilibrium, of which acidosis constitutes a phase, had, however, better be considered more fully in a special article. Still, I might say that it has been demonstrated that the normal for the blood is a pH of 7.3 to 7.5—a slightly alkaline reaction—with probably narrower limits for the individual, and that 7.0 to 7.8 is probably the extreme range of reaction compatible with life in human beings. One appreciates the extreme effectiveness and

delicacy of the mechanism that controls this reaction if the pH be expressed in other terms—those of actual hydrogen-ion concentration. Thus, if life is to be preserved, the weight of hydrogen-ion per liter of blood must not be more than one ten-millionth of a gram, nor can it be so little as one one-hundred-millionth of a gram. The factors that maintain and defend this constancy will not be discussed here, but suffice it to say that the blood and body fluids contain several important buffers (see above) that are effective in this regard. The pH of the other body fluids (not the excretions) probably closely approximates and promptly follows any change in that of the blood plasma. The consequence is that there is preserved for the cells of the body a reaction, or hydrogen-ion concentration, of the fluids in which they are bathed that is optimum and necessary for their proper activities. We mimic this action when we provide a suitable reaction in media for growth of bacteria or activity of enzymes.

I do not think it necessary to further urge the point that a clear understanding of the meaning of hydrogen-ion concentration is necessary to any medical man who endeavors to comprehend the metabolic processes occurring in the human body. To the bacteriologist and other workers with manifestations of vital phenomena it is indispensable.

AVIATION MEDICINE IN THE UNITED STATES NAVY.

By J. F. Neuberger, Lieutenant, Medical Corps, United States Navy.

PHYSICAL EXAMINATION OF AVIATORS.

To a far greater extent than is generally realized, successful aviation depends upon the mental attitude and physical fitness of the personnel. Army experience has shown that 70 per cent of the flying accidents occurring in times of peace are due to the physical condition of the pilot, about 20 per cent to carlessness, overconfidence, and recklessness, 5 per cent to ignorance (and by that is meant insufficient knowledge of the principles of aeronautics), and 5 per cent to actual structural defects in the plane or engine and to weather conditions. It is therefore obvious that the utmost care and special methods must be employed in the selection of airmen.

The subject of examination of naval aviators is of great interest to the medical officer and of the utmost importance to the naval service. It not only includes the examination of student naval aviators, but also the periodical examination of aviators after they are qualified to fly. A medical officer assigned to aviation duty must have cognizance of the state of health of all the aviators on the

station. He must study the organic changes which may arise in them, and determine the cause of any functional failure which may appear in the course of their aerial service. A knowledge of these factors is necessary in order to detect at an early stage the onset of what is known as flying stress and undue fatigue, as well as the presence of any detrimental physical defects. The medical officer must always bear in mind the fact that the pilot is a combatant, that the duty of an airman is of an extremely hazardous and arduous nature, and that to perform it not only requires dauntless courage, but also a perfectly healthy body, enabling the aviator to work under conditions extremely unfavorable for the proper functioning of all organs.

The main object of the physical examination is the selection for flying duty of only such officers and enlisted men as are physically and mentally qualified for such duty, and to remove from a flying status those who may become temporarily or permanently unfit for flying on account of physical or mental defects.

The determination of the fitness of officers and men for detail to training in aviation involving actual flying is based upon prescribed physical examinations. The selection and examination of persons for the actual flying of aircraft is one of the most difficult tasks confronting the medical officer. In general naval practice the failure of the medical officer to detect some physical defect in a candidate for appointment or promotion usually does not result in serious consequences. This is not the case in aviation. The most careful scrutiny is necessary in each case, and it is better for the candidate and for the service for a medical officer to reject an applicant when in doubt than to take a chance and pass him.

The examination which determines the presence of those special physical and mental qualifications required of an aviator is highly technical in character, and it has been found that it can properly be conducted only by medical officers who have had the proper training and instruction in this work and who have the special instruments and appliances required. In the United States Army examinations of this type are made only by flight surgeons or other medical officers who, after a special course of instruction, are authorized in writing by the Surgeon General of the Army to conduct such examinations. It is believed that it would be advantageous to have this same procedure followed in the Navy and to have applicants examined only by such medical officers as have had special training in this type of duty.

The writer believes that the Bureau of Medicine and Surgery should issue the following instructions governing medical officers making physical examinations for aviation. Similar instructions are in effect in the Army.

1. The physical examination of personnel for flying heavier and ghter than air craft will be made only by medical officers specially tailed by the Bureau of Navigation on the recommendation of the ıreau of Medicine and Surgery. Records of physical examination d reexaminations which reveal the existence of physical defects will ot be considered complete until final action thereon has been made the Bureau of Medicine and Surgery.

2. No person shall be assigned to duty as pilot or permitted to lot any aircraft until he shall have successfully passed the pre-ribed physical examination.

3. Reexaminations of all pilots and observers and those undergoing ying training shall be made in January and July of each year; also henever considered necessary by the commanding officer to deter-ine the physical fitness of anyone to continue flying or flight train-g. Commanding officers shall at once, upon recommendation of ıe flight surgeon, suspend the flight training of, or relieve from ying duty, any individual reported physically incapacitated, and ıey may authorize, in case the incapacity is of a temporary nature, ıe resumption of such training or duty when the individual is again eported as physically fit by the medical officer.

4. The reports of "Physical Examination for Aviators in the U. S. avy" shall be made out in triplicate and signed by the members f the board of medical examiners or the flight surgeon, one copy o be sent to the Bureau of Medicine and Surgery, one copy to accom-any the candidate's health record, and one copy to be retained for ıe permanent files of the station for reference.

5. Whenever a flyer is transferred to another station, the copy with ıe health record shall be forwarded to the medical officer of that tation.

6. Officers of the Reserve Corps, Class 5, who apply at naval air tations for permission to pilot aircraft must undergo the above rescribed physical examination unless they present satisfactory vidence showing that they successfully passed the physical examina-ion within six months of the date flight is desired.

7. Waivers of physical defects will be made only by the Bureau f Medicine and Surgery, but waivers should not be recommended y the examining officer unless absolute assurance exists in his mind ıat the waiving of the disabilities will not be followed by accident.

In conducting the physical examination of aviators the following utline will be found useful. It was developed by the Army Air ervice.

REPORT OF PHYSICAL EXAMINATION FOR AVIATORS IN THE U. S. NAVY.

Place_____

Date_____

Name_____
(Surname.) (Christian name-s.)

Rank_____ Age_____

1. History of previous or present eye trouble_____

2. Stereoscopic vision, if stereoscope is available_____

3. Ocular movements_____

4. Pupillary reactions_____
(Direct, consensual, accommodation.)

Right eye_____

Left eye_____

5. Intraocular tension: {Right_____ Left_____

6. Any visible lesion of the eyes: {Right_____ Left_____

7. (*a*) Is ocular nystagmus present?_____

(*b*) Does ocular nystagmus occur when eyes are turned easily to one side? _____

(*c*) Does ocular nystagmus occur when eyes are turned to the extreme side? _____

8. Field of vision: {Right_____ Left_____

9. Color vision_____

10. Muscle balance at 20 feet (use phorometer or Maddox rod):

Hyperphoria_____

Esophoria_____

Exophoria_____

11. Visual acuity:

(*a*) Distance, at 20 feet: {Right_____ Left_____

(*b*) Near point: {Right_____cm._____ Left_____cm._____

(*c*) Angle of convergence_____

12. Ophthalmoscopic findings (5 per cent euphthalmine dilatation: {Right_____ Left_____

EAR.

13. History of ear trouble_____

(*a*) Ever have ringing or buzzing in either ear, earache, discharge, or mastoiditis?_____

(*b*) Ever have attacks of dizziness from any cause?_____

(*c*) Ever been seasick?_____If so, how often?_____

And how long does it last?_____

(*d*) Ever had a severe injury to head?_____

4. (*a*) Appearance of external auditory canal: {Right_____ Left_____

(*b*) Appearance of membrana tympani: {Right_____ Left_____

(c) Hearing—(watch, number of inches): {Right_____inches. Left_____inches.

Whisper—(number of feet): {Right_____feet. Left_____feet.

NASO-PHARYNX.

5. Condition of nares (if obstructed, state degree, character, and cause):
Right_____
Left_____

6. Condition of tonsils and history of attacks of tonsilitis:
Right_____
Left_____

7. Presence of adenoids_____

8. Condition of Eustachian tubes (if obstructed, state character and degree after politzerization or per catheter)_____
_____

9. Static tests, horizontal plane (shoes removed). Applicant to stand with knees pressed back, arms loose by side of body, eyes closed, inner margins of feet touching each other_____
_____
_____

10. Equilibrium (vestibular), head tilted forward 30 degrees. Eyes closed. Rotation nystagmus normal, 26 seconds allowable.

(*a*) Right: Applicant to be turned toward his right, 10 times in exactly 20 seconds, horizontal nystagmus to left for____seconds.

(*b*) Left: Applicant to be turned toward his left, 10 times in exactly 20 seconds, horizontal nystagmus to right for____seconds.

(*c*) Pointing tests:

(1) Before turning: {Right arm_____ Left arm_____

(2) After turning 10 times in 10 seconds to right: {Right arm____ Left arm_____

(3) After turning 10 times in 10 seconds to left: {Right arm____ Left arm_____

(d) Falling tests:

(1) Turn to right, 5 times in 10 seconds. Falls to .....

(2) Turn to left, 5 times in 10 seconds. Falls to .....
.....
.....

11. Dynamic tests, horizontal plane (eyes closed and shoes removed). Applicant to walk on feet flat to floor straight forward 20 feet and back to point of starting. Slight variation allowable if not constant.....
.....
.....

22. Previous medical history:

	Date.	Duration.	Complication.
(*a*) None			
(*b*) Tonsillitis			
(*c*) Scarlet fever			
(*d*) Measles			
(*e*) Mumps			
(*f*) Pneumonia			
(*g*) Typhoid			
(*h*) Lues			
(*i*) Gonorrhea (acute)			
(*j*) Rheumatism (number attacks)			
(*k*) Asthma (number attacks)			
(*l*) Hay fever (number attacks)			
(*m*) Malaria (number attacks)			

23. Height: ..... inches. Weight: ..... pounds.
Bouchard's factor: ..... Temperature .....
24. Chest measurement: Expiration: ..... inches. Inspiration: ..... inches.
Waist measurement at umbilicus: ..... inches.
25. Respiratory .....
26. Bones and joints .....
27. Skin .....
28. Vascular system:
(*a*) Pulse rate (sitting) ..... per mintute. Quality .....
(*b*) Condition of arteries .....
(*c*) Condition of veins .....
(*d*) Blood pressure (sitting): Systolic ..... Diastolic .....
(*e*) Heart .....
1. Murmurs .....
2. Arrhythmias .....
(*f*) Hemorrhoids .....
29. Digestive system .....
30. Hernia .....
31. Genito-urinary system .....
32. Urinalysis .....
Specific gravity .....
Reaction .....
Casts .....
Albumen .....
Sugar .....
33. Family history of insanity or other nervous diseases .....
.....
.....
34. Intemperance: Tobacco..... Alcohol..... Drugs.....

35. Syphilis		Epilepsy	
Dizziness		Fainting	
Headaches		Stammering	
Enuresis		Somnambulism	
Insomnia		Dreams	
36. Memory		Will grasp	
Phobias		Worries	
Anxieties		Conflicts	
Complexes		Irritability	
Apathy		Elation	
Depression			

37. Station.....
38. Patellar reflexes.....
Tic..... Tremor.....
39. Psychomotor tension: Peripheral circulation:
Normal..... (Normal).....
Increased..... (Relaxed).....
Decreased.....
40. Is the candidate physically qualified for flying duty? .....
If not, state reason for disqualification.....
.....
.....
.....
.....
(Rank.)

EXAMINATION OF THE EYE.

1. *History of previous or present eye trouble.*—The applicant should be questioned regarding previous or present eye trouble, use of glasses, headaches migrainous in character, and accompanied by hemianopsia, lacrymation, scotomata and photophobia. Diplopia, night-blindness and symptoms of glaucoma are conditions which disqualify the applicant.

Regarding the determination of refractive errors under a cycloplegic, Army examiners have found that if a careful analysis is made of the relations between age, vision at infinity, the near-point of accommodation, and the muscle balance, this together with the estimate of the refraction with the ophthalmoscope will be sufficiently accurate for all purposes and obviates the necessity of a complete refraction.

2. *Stereoscopic vision.*—It requires excellent stereoscopic vision to make a landing with an airplane. "Stereoscopic vision is the ability to appreciate depth and distances by means of binocular single vision which is determined by means of the stereoscope. Objects printed on the three test cards furnished for use with the stereoscope are drawn to scale, the distance between corresponding points of similar objects are equal; between dissimilar objects, unequal. They are seen at different apparent depths, the result of superposition of each two similar images in space; the less the distance between the objects the nearer they appear to the observer's eyes, the greater the distance the farther away they appear. A normal eye can appreciate an apparent difference in distance between stereoscoped objects of 0.01 mm. When using the stereoscope adjust the oculars at their focal distance (15 cm.) from the glass stage and rotate by means of the milled edge on either ocular cup so that the interpupillary distance will be as great or greater than the distance between any two similar points of objects to be stereoscoped. With good illumination have the candidate name the sequence of objects from front to rear

as he sees them through the stereoscope. This should be done readily and without error, otherwise it is a cause for rejection.[1]"

A candidate who has binocular vision will be able to see two dissimilar images placed in the stereoscope and to fuse them into a single image. This is impossible for one who has only monocular vision.[2]

"In conducting this examination patience is needed to teach the applicant what he is expected to do. Since stereoscopic vision is essentially a binocular act, it is important to make sure that the applicant is actually seeing the picture with both eyes simultaneously. The method of telling whether the applicant is using both eyes is as follows: While the applicant is holding the instrument in the proper position with the headrest touching or nearly touching the forehead and is trying to see pictures, the card being at about the middle of the slide, cover first one lens and then the other with a card and ask the candidate if he sees the particular picture he is looking at equally well with each eye. If so, then, when the card is removed he should either fuse the images or see double, or suppress one image. If he fuses, he will detect the stereoscopic separation in space of the objects depicted on the card."[1]

The stereoscope offers in reality a very complicated test and was found to be not quite satisfactory in aviation medicine. A 6-meter stereoscope was developed by Capt. H. J. Howard, U. S. Army, which is used in the following test.

Depth perception at 6 meters.[3]—(a) The apparatus is placed permanently against the wall beneath the Snellen test charts where it will receive the overhead illumination; care will be taken to have it set straight so that on the zero line both rods will be equidistant from the applicant.

(*b*) Procedure: The rods in the box are widely separated by the examiner and the applicant instructed to manipulate the two cords so as to bring the movable rod beside the fixed one in a position where both rods appear to be the same distance from him. The test is repeated several times, the rods being widely separated before each trial. The applicant's estimation of depth difference is read in millimeters directly from the scale and entered on the record.

(*c*) Precautions: All information concerning the results of the different trials is denied the applicant before the test is completed. The applicant is also required to hold his head straight and not to one side or the other.

Care must be taken to avoid casting a shadow on the background or letting the applicant judge from the expression of the examiner, when the rods are placed correctly; or in giving the applicant information as to his error by placing his hands so that he can see the direction and extent of any error in his placing of the rods.

(*d*) Interpretation of the findings: An average depth difference of more than 30 mm. disqualifies the applicant.

3. *Ocular movements.*—Ocular movements are tested roughly by requiring both eyes of the candidate to be fixed on the examiner's finger which is carried from directly in front, to the right, to the left, up and down. The movements of each eye must be regular and identical.[1]

4. *Pupillary reactions.*—Pupillary reactions should be regular and equal in each eye when responding to direct light stimulation, indirect light stimulation, and accommodation.

The reflexes are tested as follows: Place a card as a screen before both eyes, uncover one eye after a short interval and allow light to shine into this eye; the contraction of the iris of this eye is the result of direct stimulation. Repeat the process and observe the shaded eye. The reaction observed is caused by indirect stimulation and is often spoken of as the consensual reaction. Treat the other eye in the like manner.

With both the candidate's eyes open and uncovered, have him look at the end of a pencil held directly in front of him and follow it while the pencil is brought toward him until it nearly touches the nose. In a normal person both irides will contract—a phenomenon known as the reaction of accommodation.

5. *Intraocular tension.*—Intraocular tension is tested roughly by palpation. The candidate looking downward, palpate the eye through the upper lid with the index finger of each hand and compare the tension with the other eye, and with an eye which you know to be normal.[1] If the tension is not normal it is a cause for rejection.

6. *Visible lesions of the eye.*—The eyes, generally, should be free from disease, congenital or acquired, such as lesions of the cornea, iris, or lens, including affections of surrounding structures, such as pathological conditions of the lachrymal apparatus, conjunctival deformities, or any other affection which would tend to cause blurring. This examination should be carried out before a well-illuminated window, assisted by the use of a hand lens.[1] The following conditions are commonly found: Ptosis, blepharitis, ectropion, chalazion, trachoma, corneal scars, pannus, and pterygium. Any pathological condition which may become worse or which interferes with the proper functioning of the eyes under the fatigue and exposure of flying disqualifies the applicant.

7. *Nystagmus.*—By nystagmus or tremulousness of the eyes are meant short, jerking movements of the eye which are very rapidly repeated and always occur in the same direction. The movements of the eyes, as a whole, are not affected by it. Different kinds of nystagmus are distinguished according to the direction in which the movements occur. It results from amblyopia, many *cerebral* affec-

tions, particularly of disseminated sclerosis and irritation of the endings of the vestibular nerve in the simicircular canals.[2]

8. *Field of vision.*—The field of vision is tested separately for each eye. Place the candidate with his back toward the source of light and have him fix the eye under examination (the other one being covered) upon the examiner's eye, which is directly opposite at a distance of 2 feet. The examiner then moves his fingers in various directions in a plane midway between the candidate and himself until the limits of indirect vision are reached. The examiner thus compares the candidate's field of vision with his own and thus estimates whether it is normal or not. If abnormality is detected, its extent should be determined by the use of a perimeter.[1]

9. *Color vision.*—The writer knows of no better test for color vision than that directed by the Manual for the Medical Department, U. S. Navy (Holmgren's method).

10. *Muscle balance.*—In the normal state the eyes in every natural position are in perfect muscular equilibrium—a condition known as orthophoria, which may be demonstrated in the following manner: We cause the candidate to look steadily at an object located 30 cm. from him with both eyes. Then we push a sheet of paper before one eye and watch behind the paper the eye thus covered. We find that the eye remains correctly adjusted for the object, although it no longer sees it. It remains in this position because its equilibrium is not disturbed by any interference with the innervation which is supplied to the individual muscles. Disturbances of muscular equilibrium may be recognized by the same experiment. They occur in three forms: *Hyperphoria*, when there is a tendency for one eye to deviate up or down; *esophoria*, a latent convergence of the eye, and *exophoria*, a latent divergence. The latter is by far the more frequent.[2]

"Under the stress of flying, defects of muscle balance are quickly brought out. The ordinary individual on the ground is concerned chiefly with straight-ahead vision, and a slight weakness of one or more ocular muscles is not of importance: but the flyer has to look in all possible directions, particularly in combat work, and that, added to the mental strain connected with flying, together with low oxygen conditions, brings out diplopia."[4]

In the practice of aviation medicine several tests are in use to determine the muscle balance of the candidate.

A. "*The Maddox rod screen test at 6 meters.*—(*a*) Apparatus: A phorometer trial frame equipped with a pair of multiple Maddox rods and a pair of Risely rotary prisms; a blank card about 6 by 9 cm., which serves as a screen; a spot light about 1 cm. in diameter.

"(*b*) Procedure: Before beginning the test the applicant's sighting or fixing eye is determined. For this purpose a blank card

about 13 by 30 cm., with a 3 cm. round hole in the center, is employed. The applicant, seated, facing a spotlight 1 cm. in diameter, placed 6 meters away, grasps the card by the short sides with both hands. While looking intently at the light, he slowly raises the card at arm's length and locates the light through the hole without closing either eye. Only one eye can see the light through the hole and the eye selected for this purpose is the one used habitually for sighting or fixing.

"Having determined the sighting eye, the phorometer-trial frame is adjusted closely in front of the applicant's eyes. One of the multiple Maddox rods is swung into position before the nonfixing eye. A rotary prism is placed before the same eye. The sighting or fixing eye must have an unobstructed view of the spot light. For measurement of esophoria or exophoria the Maddox rod is adjusted before the nonsighting eye to give a vertical line of light. The rotary prism is adjusted also before the nonsighting eye for the measurement of lateral deviation and set 4 or 5 prism diopters off the zero mark. This gives enough deflection at the first reading to detect an applicant who has been coached to say the line passes through the light.

"The 6 by 9 cm. card is moved from one eye to the other a few times to ascertain if the applicant sees both the line and the light. If the line is not readily seen, the Maddox rod is readjusted by centering it carefully in front of the pupil. Some further darkening of the room may be necessary to render it clearly visible.

"When the applicant sees the line with one eye and the light with the other, the examiner holds the card or screen in front of the nonfixing eye to shut out the image of the line. The applicant now sees only the light. After he has fixed it for several seconds, the screen is removed for an instant and quickly replaced. In that brief interval the applicant should see the line and be able to locate it with reference to the light. After one or two such exposures he will say that the line is to the right or to the left of the light or possibly through it. He is instructed to grasp the milled head that rotates the prism and turn it to bring the line directly into the light. To enable him to do this, the screen is removed from the eye at intervals and quickly replaced. Finally the applicant will have rotated the prism enough to cause the line to pass through the light every time he sees it when the screen is removed. The number of prism diopters necessary to do this is read from the scale of the rotary prism. This is entered on the scale as esophoria if the prism is base out, and exophoria if the prism is base in. For the measurement of hyperphoria the Maddox rod is readjusted before the fixing so as to give a horizontal line of light. The rotary prism is also readjusted before the same eye to measure vertical deviacion. The screen is used exactly as before to give an occasional

glimpse of the line. The number of prism diopters read from the scale is recorded as right hyperphoria if the prism is base down before the right eye or base up before the left eye. It is recorded as left hyperphoria if the prism is base up before the right eye or base down before the left.

"Precautions: The phorometer attachment is not used for measuring the amount of heterophoria. The Maddox rod and the measuring prism are used always together before the nonfixing eye and never before the fixing eye. The test gives an inaccurate result if the applicant is permitted to see the line for a longer time than is allowed by the momentary exposure described above.

"Esophoria of more than 4 diopters is a disqualifying factor if associated with diplopia in the lateral positions on the tangent curtain, or if associated with an amount of accommodation near the lower limits, or if associated with an amount of hyperopia near the disqualifying limit.

"Esophoria of more than 10 diopters is a disqualifying factor, even if unassociated with any of the preceding conditions.

"Exophoria of more than 2 diopters is a disqualifying factor if associated with an angle of convergence near the disqualifying limit, or if associated with diplopia in the lateral positions on the tangent curtain.

"Exophoria of more than 5 diopters is a disqualifying factor even if unassociated with any of the preceding conditions.

"Hyperphoria of more than one-half diopter disqualifies the applicant without further supporting evidence."[3]

B. *The Maddox rod screen test at 33 cm. will often be found useful.*—"(*a*) Apparatus: Phorometer trial frame; small light from electric ophthalmoscope.

"(*b*) Procedure: The light is held in the median line 33 cm. from the eyes. The test proceeds exactly as described for 6 meters, but is not made for hyperphoria.

"(*c*) Precautions: Same as for the 6-meter test.

"(*d*) Interpretation of findings. Exophoria of 4 diopters may be considered the normal condition. Any considerable variation from this condition is to be interpreted in connection with other associated tests. An exophoria of more than 12 diopters at 33 cm. disqualifies."[3]

C. *Prism divergence.*—"(*a*) Apparatus: Phorometer trial frame; spot light 1 cm. in diameter.

"(*b*) Procedure: The applicant is seated facing the spot light 20 feet away. The rotary prism of the phorometer trial frame is adjusted before one eye so that by turning the milled head the prism will be acting base in. With the prism set at zero on the scale the applicant should see but one spot of light. As the prism is slowly rotated base in, diplopia will be produced. The number of prism diopters

which causes the onset of diplopia is read from the scale and entered on the record as prism divergence.

"(*c*) Precautions: The test can not be made if the applicant has diplopia when the prism is set at zero on the scale. If this later condition obtains, the candidate is disqualified.

"(*d*) Interpretation of findings: Prism divergence of more than 9 diopters disqualifies the applicant if associated with an angle of convergence near the disqualifying limit. If less than 4 diopters prism divergence is found associated with more than 4 diopters of esophoria at 6 meters, the applicant is disqualified.

"Prism divergence of more than 15 diopters disqualifies without further evidence. Prism divergence of less than 2 diopters disqualifies without further disqualifying evidence."[3]

D. *Test of associated parallel movements.* "(*a*) Apparatus: A pin with a white head 2 mm. in diameter.

"(*b*) Procedure: The applicant stands near a window where good illumination falls on both eyes. The examiner holds the white-headed pin about 33 cm. directly in front of the applicant's eyes and directs him to look at it steadily. Nystagmus in the primary position is to be noted at this stage of the test. The applicant is then instructed to hold his head still and watch the pin as it is moved slowly to the right. The pin is not carried beyond the field of binocular fixation, but is held motionless for a moment near the lateral limit of the field. Each eye is inspected to discover any failure in fixing the pin. The lagging or overaction of either eye is noted. The pin is then carried slowly to the extreme left, up and to the left, straight up, up and to the right, down and to the right, straight down, down and to the left. The lagging of either eye in any one of these eight cardinal directions is due to underaction of at least one of the extrinsic ocular muscles. It may indicate a paresis or a complete paralysis. This underaction is recorded by stating which eye lags and in which direction the lagging is observed. In the same way any overshooting of either eye is recorded by stating which eye is involved and in which direction.

"If any underaction or overaction is revealed by this test, the final diagnosis is made or verified on the tangent curtain by means of a small electric light or candle and a red glass. From the associated parallel movement test and the plotting of diplopia on the tangent curtain a diagnosis of the individual muscle or muscles involved is readily made.

"Whether the diplopia is crossed or homonomous is evidenced by the side on which the red image appears in relation to the eye before which the red glass is placed.

"(*c*) Interpretation of findings: The applicant is disqualified if the underaction or overaction of any of the extrinsic ocular muscles

produces diplopia except in the extreme positions, where a small separation of the images may be disregarded. Nystagmus disqualifies if it is demonstrated except in extreme positions."[3]

11. *Visual acuity.*—"(*a*) Apparatus and set-up: Five Snellen test charts, each with a different arrangement of letters; a blank card about 6 by 9 cm. Four of the test charts are partially covered by black paper, leaving exposed only the 20 feet and successive smaller rows of letters. One chart, the central one, is left fully exposed. The five charts are arranged in close formation against a neutral colored wall at the end of the examination room and each one numbered. These numerals must be distinctly visible at a distance of 20 feet. Two 100-watt daylight Mazda lamps with reflectors are installed about 4 feet above and in front of the test charts to provide uniform illumination. A single 200-watt daylight Mazda lamp in a suitable reflector may be substituted for the above. The switches controlling these lamps and the spot light used with the phorometer trial frame should be located on the side wall where they can be reached easily by the examiner as he stands beside the applicant's chair. All windows and other sources of light located in front and to the side of the applicant are shaded during the examination.

"(*b*) Procedure: Immediately upon entering the room, the applicant occupies a chair facing the test charts exactly 20 feet away. The test is begun promptly to prevent study of the letters. The examiner stands at one side of the applicant, using the 6 by 9 cm. card to cover the left eye while the right is being tested. Designating one of the partly exposed charts by number, the examiner instructs the applicant to read as many letters as possible. When the best vision for the right eye has been obtained, the card is shifted to cover the right eye and the left eye is tested on one of the other partly exposed charts. The fully exposed chart is used only when vision is less than 20/20. The row of smallest letters read correctly, determines the fraction used in recording visual acuity. The number of smaller letters read in the next line is added to this fraction following the plus sign, i. e., 20/20+5.

"(*c*) Precautions: Every possible safeguard should be thrown around the test to prevent memorizing the charts. Applicants awaiting their visual acuity test are not permitted to remain in the room within sight of the test letters nor where they can hear them read aloud.

"Each eye should be completely screened from the letters while the other is being tested. The use of the hand or of an opaque disk from the trial case as a screen does not insure a monocular test.

"(*d*) Interpretation of findings: The minimal visional requirements for each eye is 20/20. If two or three letters are not read in

the 20/20 line, they may be offset by an equal number of letters read in the 20/15 line.

"(*e*) In cases where the applicant is suspected of having memorized the charts, pick out letters in the doubtful lines and have him name then,"[4] or employ Grow's unlearnable apparatus.

Measurement of the accommodation.[2]—The magnitude of accommodation is determined by measuring its limits, which are defined by the far point and the near point. The far point is that point for which the eye is focused when the accommodation is completely relaxed. The near point is that point for which the eye is focused when the accommodation is strained to its utmost.

In the normal or emmetropic eye the far point lies at an infinite distance, since the normal eye, when in the state of rest, is focused for parallel rays. Such an eye, accordingly, can see the letters of the test card distinctly when the latter is hung up at such a distance (5 or 6 meters) that no accommodation worth considering is required, so that this distance in practice is regarded as infinitely great. While the position of the far point is the same for all normal eyes, that of the near point varies greatly. It is determined by bringing fine print closer and closer to the eye until the limit of legibility has been reached. The determination of the far point is synonymous with the determination of the refraction, for the latter is, in fact, the refractive state of the eye when focused for the far point. An easy method of determining the near point is by the use of the accommodation disk (see Fuchs' Ophthalmalogy, Duane, 4th edition, p. 817) and Prince's rule. The disk is brought gradually toward the eye until the black line on it, which is 0.2 mm. in diameter, begins to grow faint. The distance at which this occurs is measuerd with Prince's rule, which is graduated in centimeters and diopters. The measurement is not taken from the eye itself, but from its anterior focus, which is 13 mm. in front of the camera.

The appended table gives the mean values of accommodation in diopters from 18 to 50 years of age. Accommodation is normal if it lies between limits 2 diopters above and below the mean for the applicant's age. Failure to read within these limits disqualifies.

TABLE OF MEAN VALUES OF ACCOMMODATION POWER (DUANE).

Age.	Diopters.	Age.	Diopters.	Age.	Diopters.	Age.	Diopters.
18	11.9	25	10.2	32	8.3	39	6.2
19	11.7	26	9.9	33	8.0	40	5.9
20	11.5	27	9.6	34	7.7	45	3.7
21	11.2	28	9.4	35	7.3	50	2.0
22	10.9	29	9.2	36	7.1		
23	10.6	30	8.9	37	6.8		
24	10.4	31	8.6	38	6.5		

Angle of Convergence.—"(*a*) Near point of convergence (PcB).

"(1) Apparatus: The Prince rule; a pin with a white head 2 mm. in diameter.

"(2) Procedure: The distance to this point is computed from the base line connecting the centers of rotation of the eyes.

"The end of the Prince rule is placed, edge up, at a mark on the right side of the nose, 11.5 mm. in front of the cornea. The white-headed pin is held 33 cm. away in the median line above the edge of the rule, and the applicant is instructed to look at it intently. If both eyes are seen to converge upon the pin, it is then carried in the median line, along the edge of the rule, toward the root of the nose. The applicant's eyes are carefully watched, and the instant one is observed to swing outward the limit of convergence has been reached. The point on the rule opposite the pin is then read in millimeters. This test is repeated until a fairly constant reading is obtained. To this reading 25 mm. is added, which will give approximately the distance from the near point of convergence to the base line, "PcB."

"(3) Precautions: Both eyes must converge upon the pin at the start of the test. The applicant's observation of the onset of diplopia is not relied upon to determine the near point, although he is asked to state when he sees double to test his veracity.

"(4) Interpretation of findings: The near point of convergence, unlike the near point of accommodation, varies little with age. Its measurement is of value only in computing the angle of convergence. Applicants are not qualified or disqualified on this measurement, but on the angle of convergence.

"(*b*) Interpupillary distance (Pd).

"(1) Apparatus: A small millimeter rule.

"(2) Procedure: The examiner stands with his back to the light, face to face with the applicant. The rule is held in the examiner's right hand and laid across the applicant's nose in line with his pupils, as close to the two eyes as possible. The examiner closes his right eye and instructs the applicant to fix his eyes on the open left eye. With the eyes in this position a predetermined mark on the rule is placed in line with the nasal border of the applicant's right pupil. The rule must be held steadily in this position while the examiner opens his right eye and closes his left. The applicant is then instructed to look at the open right eye. The point on the rule in line with the temporal border of the applicant's left pupil is read in millimeters, and the exact difference in millimeters between the two points on the rule is the interpupillary difference.

"(*c*) Computing the angle of convergence.

"(1) Procedure: The following formula is used for computing the angle of convergence.

$$\text{"Angle of convergence"}=\frac{1/2\text{Pd}\times 100}{\text{PcB}}+3$$

"(2) Interpretation of findings: Angle of convergence smaller than 40 disqualifies the applicant." [3]

Ophthalmoscopic findings.—The number of men who have been disqualified on the ophthalmoscopic examination is remarkably large. During late childhood and adolescence it is not uncommon for an individual to encounter a transitory acute chorioditis incidental to some systemic infection or dissemination of a focal infection, the evidence of which remains during life in the form of atrophic spots and clumped pigment, but which causes very little, if any, visual incapacity of the individual. It really constitutes not more than the scar following the recovery from such a disease as smallpox, and it does not indicate a condition which tends to recur. On the other hand, certain applicants show acute and subacute recrudescing chorioretinitis in the presence of full normal vision, which condition is indubitable evidence of the existence somewhere in the body of an acute focus of infection. In such cases, if the focus of infection is definitely located and eliminated, and the evidence is clear that as a result of such an elimination the chorioretinitis is on the wane—in all probability permanently—such a candidate should not be disqualified after the lapse of an adequate period of time necessary to ascertain that the chorioretinitis is on the wane. Such ocular manifestations of focal infection as anterior uveitis or so-called serous iritis should not be overlooked and should be regarded as disqualifying, unless strong evidence can be brought to bear to indicate that the source has been permanently removed.[1]

EAR.

History of ear trouble.—The fact that very few candidates are willing to admit ear discharge or dizziness must be taken into consideration when eliciting a history of previous ear disease. Therefore, conclusions will have to be drawn from the examination of the drumhead and subsequent hearing and rotation tests. Most applicants deny that they have ever been seasick, thinking thereby to prove that they would be unaffected by the motion of an airplane. It is to be emphasized that it would be improbable for a person with perfectly normal ears not to become seasick upon his first exposure to a rough sea.

Appearance of membrana tympani.—A perforation of the eardrum is a cause for rejection. If the eardrum is excessively thin or scarred, it should receive special attention, even if hearing is normal.

Hearing.[1]—Hearing should be normal for each ear. To determine it, the coin-click, watch test, and whispered voice are used. Both external auditory canals and membrani tympani are examined by means of a speculum and good light. All wax must be removed from the external auditory canal. If external to the bend of the canal, this wax can be removed with an ear spud or forceps. If internal to the bend of the canal, the canal should be filled with a bland oil and blocked with cotton. The following day thorough washing of the external canal with a solution of sodium bicarbonate will remove the wax. The external canal is then examined throughout. Any serious permanent blocking of the canal or diseased condition which threatens trouble later on, such as the impairment of hearing, disqualify. The presence of a small scar caused by trouble several years previous which has not recurred and with which there is no deficiency of hearing and no evidence of other inflamation does not disqualify. Retraction of a membrane which can not be reduced or which occurs repeatedly disqualifies.

An assistant closes the ear not under examination. The examiner standing 20 feet in back of the candidate then clicks two coins softly together and the candidate is directed to count, aloud, the number of clicks each time. The other ear will then be tested in a similar manner. If unable to hear, the examiner will approach until the candidate does hear, the distance being recorded in feet. If less than 20 feet it is a cause for rejection. The number of feet is recorded on the blank. A quiet room is essential.

The watch test is preferably made with a loud-ticking watch, such as the ordinary Ingersoll, which, while variable, should be heard at about 40 inches. Any watch used should have been previously tried out on at least five normal persons and the distance heard made a matter of record. If the examiner's hearing is normal, he should check the distance at which the watch should be heard against his own hearing, the watch being equidistant from his own ear and that of the applicant. The distance in inches at which the watch is heard by the candidate, eyes closed and the opposite ear occluded, is taken as the numerator and the distance the watch should be heard as the denominator. This should be the equivalent of 40/40; otherwise it disqualifies. A forced whisper with the reserve air should be audible at a distance of 15 meters.

NASOPHARYNX.[1]

The region of the nasopharynx should be carefully examined. If defects can be removed by operation, this should be required prior to completing the examination. If nonoperable or operation refused, it is a cause for rejection.

Condition of the Eustachian tubes.—The condition of the Eustachian tubes is one of vital importance to the aviator. Generally peaking, it can be said if the applicant's drumhead and hearing is ormal, the Eustachian tube is probably normal. The patulence of ıe tube should be demonstrated by the ascultation tube during ination by means of politzerization or catheterization. The former rocedure is ample for all practical purposes. If tubal troubles are f such a nature as to demand it, an examination should be made with ome good pharyngoscope.

Static and dynamic tests.[1]—In the static test the applicant is reuired to stand in the position specified with his eyes closed for one inute. Too much importance must not be attached to the fact ıat the applicant is slightly unsteady. He is apt to expect that ıis and the dynamic test is some sort of a trick examination and ıay become very nervous. Some men sway markedly and are unble to walk in a straight line. Disqualification on these tests ıould only be made with the greatest reservation and when conrmed by other tests, showing that the applicant has marked inability of his coordinating mechanism. In the thousands of applints so far examined in the Army, none were rejected for these ıuses alone. In the dynamic test if the applicant sways more than feet from the straight line, he must be asked to repeat the test ntil the examiner is convinced that his deviation from the line is abnormal as to be a cause for rejection.

In these tests the candidate is required, without shoes, and first ith eyes open and then closed, to—

1. Stand with knees well back and inner margin of feet touching.
2. Stand on toes from position (1).
3. Stand flat on right foot and rest left foot on right knee or instep.
4. Stand flat on left foot and rest right foot on left knee or instep.
5. Walk forward with feet flat.
6. Walk to right in a circle with feet flat.
7. Walk to left in a circle with feet flat.
8. Walk backward with feet flat.
9. Hop backward on both feet flat.
10. Hop backward on right foot flat.
11. Hop backward on left foot flat.

Position 1 should be held for two minutes without abnormal vaying, and position 2 for a minute. Normal attempts at balancing ave no significance. Positions 3 and 4 should be held for at least quarter of a minute. In tests 6 and 7 there should not be expection of candidate making mathematical circles, especially with es closed, but only that he will normally tend to follow the genal direction of a circle. In making these tests and watching for

abnormal deviations, the examiner must recognize that they have relation not only to peripheral nerve disturbances but also to central conditions, especially those of luetic origin, and that the patella, Achilles tendon, and pupillary reflexes must be considered with them. It is desirable to secure the result of a Wassermann test in all candidates for aviation.

Normally, a man standing shows antero-posterior and lateral oscillations of the body, but they are never accompanied by loss of equilibrium or fall unless a pathological condition is present. Observation should be made of any tremor, which may be the cue to a defect of the thyroid and its associated endocrine system. Tremors which interfere with precise movements should be especially looked for; they are to be expected in the head, face, tongue, upper and lower limbs, and finger. Abnormalities in musculature, atrophies and hypertrophies should be noted. Tics, spasms, and cramps should be carefully observed.

The various reflexes to be noted are as follows:

1. Periosteo-tendinous reflexes. (1) Patellar, (2) tendon of Achilles, (3) ankle clonus.

2. Cutaneous and muscular reflexes. (1) Babinski's reflex, (2) cremasteric reflex, (3) abdominal reflex, (4) pharyngeal reflex.

3. Ocular reflexes. (1) Conjunctival reflex, (2) pupillary reflex.

Reflexes are classified and marked as normal, absent, diminished, hyperactive, and exaggerated.

EQUILIBRIUM (VESTIBULAR TESTS).[4]

Various tests for nystagmus, past-pointing and falling, after turning are required: "The turning chair must have a headrest which will hold the head 30° forward, a foot rest, and a stop pedal.

"(*a*) *Nystagmus.*—The candidate is seated in the turning chair with his head inclined 30° forward, so that the tragus of the ear is on a horizontal line with the external canthus of the eye. The candidate is then asked to fix his eyes on a distant point, and the chair is turned slowly from side to side in order to note whether or not spontaneous nystagmus is present. The candidate is then turned to the right, with eyes closed, 10 times in exactly 20 seconds. The instant the chair is stopped, a stop watch is started and the candidate opens his eyes and looks straight ahead at some distant point. There should occur a horizontal nystagmus to the left of 26 seconds duration. The candidate then closes his eyes and is turned to the left; there should occur a horizontal nystagmus to the right of 26 seconds duration. A variation of 8 seconds is allowable.

"(*b*) *Pointing.*—(1) The candidate sitting in the chair, facing the examiner with closed eyes, touches the examiner's finger held in front of him, and then raises his arm to the perpendicular position. By lowering the arm he attempts to find the examiner's finger. Test first the right arm; then the left arm. The normal is always able to find the finger. (2) The pointing test is again repeated after turning the candidate to the right 10 times in exactly 10 seconds. During the last turn the stop pedal is released and as the chair comes into position, it becomes locked, care being taken to ease the chair into the slot so as not to throw the candidate out. The right arm is tested, then the left, then the right, then the left, until he ceases to past point. The alternating of arms is kept up even after he ceases to past point with one arm. The normal will past point to the right three times with each arm. (3) Repeat pointing test after turning to the left.

"(*c*) *Falling.*—The candidate's head is inclined 90° forward, resting his forehead on his upper fist, his fists being placed one above the other on his knees, which are brought close together. Turn to the right five times in 10 seconds. On stopping, candidate raises his head and should fall to the right. This tests the vertical semicircular canals. Turn to the left with the head forward 90°; on stopping, the candidate raises his head and should fall to the left. Unless each test is normal, it is a cause for rejection.

"*Caloric douche test.*—So-called border-line cases can be tested by the caloric test, each ear separately. Water at 68° F. is allowed to run into the external auditory canal from a height of about 3 feet through a stop nozzle, with the head tilted 30° forward, until the eyes are seen to jerk and the individual becomes dizzy. This should be accurately measured by a stop watch. The type of nystagmus is then noted. With the head in the upright position, it should be rotary and the direction of the jerk should be to the side opposite the ear douched. The length of the douching shown by the stop watch in the normal is 40 seconds. The eyes are then closed and the past pointing is taken. The head is then immediately inclined backward 30° from the perpendicular; there should appear a horizontal nystagmus to the side opposite the ear douched. The eyes are then closed and the past pointing is taken with the head in this position. The left ear is then douched and the same procedure is carried out. If instead of 40 seconds of douching there was required not more than 30 seconds, the applicant is not rejected. Care should be taken that the cold water reaches the drumhead, as wax or other obstruction in the external canal would interfere with the responses in a perfectly normal individual."

GENERAL EXAMINATION.

Age of aviators.—The age of an aviator engaged in actual flying should be between 21 and 35 years. There are many men who are not fully developed at 21 years and if they are to be accepted as pilots they must fulfill the physical requirements described in this article. Although men above 35 should not be accepted for training, that does not mean that men over 35, who have had previous training, should not be allowed to pilot a seaplane, provided they measure up to the necessary physical standard. The best index to a man's age is his physical condition. One man might be older physically at 30 than another would be at 40. After the age of 45 no man should be allowed to pilot an airplane alone, and if he is in the service he should be returned to some other duty, or should be ordered as commanding officer or executive officer of a ship or station engaged in aviation activities.

Height and weight.—At the present time, in the United States Navy, the same specific rules regarding height and weight are laid down for all aviators. Naval aviation, however, is divided into two branches, namely, the flying of heavier-than-air machines and the navigation of lighter-than-air machines. Heavier-than-air machines include airplanes and seaplanes of all sorts, and lighter-than-air machines comprise dirigibles, free and kite balloons. A man with an average physique might make an excellent lighter-than-air pilot, but he can not handle an F–5–L or an H–16 or any other heavy type of seaplane where physical strength and endurance are required over a long period of time. It is believed that the minimum weight of any heavier-than-air pilot engaged in flying big seaplanes in the Navy should be 150 pounds. It is preferable to have the applicant weigh more than 150 pounds. There is, at the present time, a tendency in the Navy toward the development of light planes for scout and spotting duty. These planes can be handled by a man of less weight, but he must, nevertheless, possess good physical and muscular development, and with regard to height and weight should come within the factors described herein. Men weighing less than 150 pounds should not be trained for big seaplane piloting, but could be trained for small seaplanes or scout duty. It is, however, a most difficult task to set different standards for physical examination, and is also disadvantageous to train a man only to fly a certain type of plane. As the man weighing 150 pounds is just as able to pilot a scout plane as the lighter man, and at the same time has the necessary requirement for flying larger planes, it is obvious that he is the logical man for aviation duty and he, therefore, should be the only type of man de-

sired and selected. While the piloting of lighter-than-air craft requires less physical strength, physical endurance is of great importance, and the writer therefore believes that the minimum weight for that type of aviation should be not less than 140 pounds and the candidate must come within the factors described, as they give a general indication to the man's physical make-up. The lighter-than-air pilot must stay in the air for a long period of time, in all sorts of weather, especially on balloon flights, and he often encounters many hardships. The case of the three officers who left the Rockaway Air Station in December, 1920, in a balloon and landed in Canada is still fresh in everyone's mind, and the hardships these officers endured can only be appreciated by those who personally heard their story. As the writer examined the three officers on their return to the station, he can truthfully state that two of the officers were practically nervous wrecks and the third one showed plainly the signs of exposure and hardship. These officers were good, healthy specimens of manhood before leaving the station. Had it not been for their good physique, they could never have survived this terrible exposure.

It is therefore obvious that a good physical specimen with an average weight of about 150 pounds is the logical man for aviation duty involving actual flying of aircraft of whatever sort. In order to obtain a certain standard of height, weight, and muscular development, the following methods are recommended. The first method employs the "Factor of Bouchard." The factor is represented by P/H. P is the weight in kilograms and H is the height in decimeters. The average of this factor gives a first indication of wasting or obesity. It may range from 1 to 10. No one under 3.9 or above 5 should be accepted. If, for instance, a man weighs 140 pounds and measures 68 inches, the factor would be as follows:

140 pounds=62 kilograms.
68 inches=17.2 decimeters.
Therefore 63/17.2=3.7.

This man is, therefore, under the passing mark. Another illustration (one of excess weight) is:

220 pounds=100 kilograms.
72 inches=18.2 decimeters.
100/18.2=5.4.

Therefore, above the passing mark.

The following is a table of height and weight, the standard of what should be necessary for qualification of naval aviators.

Height.		Weight.		Factor.
In inches.	In decimeters.	In pounds.	In kilograms.	
66	16.7	150	68	4.07
67	17.0	154	70	4.11
68	17.2	161	73	4.24
69	17.5	168	76	4.34
70	17.75	175	79	4.46
71	18.0	182	82	4.55
72	18.2	189	85	4.66

The marks are interpreted as follows:
Above 5.0 obese.
3.6 slender.
2.9 wasted.
2.0 very wasted.

Another index of measurement may be derived from the formula (P+p)—T, P representing the weight in kilograms, p the circumference of the chest in centimeters, T the height, also expressed in centimeters. The average constant for the qualified subject is —20. The further the figure rises above this mark, the better will be the constitution of the man under examination. The writer checked all the pilots on one station by this method and found that those pilots who came furthest above this mark not only were the best physical specimens but also were the best aviators and had the reputation as such on the station. All pilots tested had had their physical examination previous to their reporting at this station, and were not originally examined by him. He picked out for illustration three flyers, who are all heavy seaplane pilots. The first man had the reputation of being an excellent pilot, the second was a fairly good pilot, and the third one had been reported to the writer by the squadron commander as having a great deal of difficulty in handling a large plane.

Officer No. 1. Excellent pilot. Weight, 187 pounds=83 kilograms; height, 70½ inches=187 centimeters; chest (mean), 38 inches=98 centimeters. (83+98)—187=—6.

Officer No. 2. Fairly efficient pilot. Weight 147 pounds=66.5 kilograms; height, 66 inches=167 centimeters; chest (mean), 34 inches=86 centimeters. (66.5+86)—167= —14.5.

Officer No. 3. Very poor pilot. Weight, 121 pounds=55 kilograms; height, 68 inches=172 centimeters; chest (mean), 30½ inches=77 centimeters. (55+77)—172= —40.

The height of a naval aviator should not be less than 67½ inches. No small man should be accepted as a big seaplane pilot, as he does not possess sufficient height to reach the rudder bars with his feet. I have seen numerous pilots who have had to have special devices made for them to enable them to reach the rudder bars, thereby making up their deficiency in height.

In discussing the above requirements, numerous arguments may be advanced to the effect that these requirements are too stringent. It is often stated that in the near future the mechanism of the seaplane will be such as to enable the pilot to control all movements of the plane mechanically. Granting this to be true, the fact remains that in aviation to-day the human element is the most important factor, and any kind of mechanism, no matter how perfect, is liable to defects, and should the aviator encounter any difficulty while in the air due to mechanical defect it will be necessary for him to possess the necessary physical strength and endurance to handle the plane and pilot himself to safety.

The chest expansion of the applicant should be at least 2½ inches. The muscles should be well developed, and although an athletic figure is not absolutely necessary, it is extremely desirable. An average strength should be required, together with such resistance to muscular fatigue as will allow the pilot to fly from 15 to 20 hours or longer.

Personal history.—The family and personal history should be carefully inquired into. Particular attention should be paid to the diseases of the respiratory and nervous systems. Special inquiry should be made for epilepsy, insanity, paralysis, and tabes. The same inquiry is rapidly directed through the collateral history, and one should find out whether a brother or sister died in youth from convulsions or other diseases. The study of personal history takes a great deal of tact on the part of the medical officer. The candidate knows that any information that he may voluntarily give might lessen his chances for acceptance. Question the candidate about diseases of childhood; any acute or chronic diseases, acute articular rheumatism, pleurisy, typhoid, and syphilis. An attempt is made to elicit grand and petit mal. Generally speaking, every nervous manifestation in a candidate for avaiation should be minutely investigated. Candidates who have had malaria should not be accepted. Wounds should be the object of special attention, not only in the case of the applicant, but also of the qualified aviator, who sustained them as the result of a crash. The medical officer is often called upon to give an opinion as to their aptitude for flying. The decision must rest upon a fairly precise knowledge of the plane in use and on the manner of managing it. The medical officer must bear in mind that the pilot is exposed to abnormal conditions and to very low temperatures. Trophic disturbances are often associated

with old wounds. Pilots who are normal in every way often suffer from cramps in the legs due to pushing the rudder bars over a long period of time.

Respiratory system.—The examination of the respiratory system is that usually employed in chest work. But the incompatibility of certain pulmonary affections to aviation must be noted. Very many external conditions are encountered during flight which are not experienced by individuals in the ordinary walks of life, such as changes in the atmospheric pressure, variations in the constituents of the air, changes in temperature, hygrometric state and in the resistance of the air. The atmospheric pressure diminishes in proportion as the height in the atmosphere is increased. The following table shows the decrease in pressure.

Sea level = 760 mm.	1,000 meters = 670 mm.
500 meters = 714 mm.	5,000 meters = 406 mm.

The modification in the composition of the air at different heights has a marked effect on respiration. Oxygen diminishes because of the diminished pressure. This is a very important point to remember in the use of the rebreathing apparatus to be described later in this series of papers. This amount of oxygen at a height of 5,000 meters becomes for the same volume of air half as much as at sea level. The temperature diminishes by 0.5° to 0.6° centigrade for each 100 meters up to the height of several kilometers.

Of all the constituents which make up the air and which are constantly present, water vapor is the most variable in proportion. The tension of water vapor diminishes rapidly with altitude following diminution in atmospheric pressure. One of the first unpleasant sensations an aviator notices when he reaches a somewhat high altitude is an uncomfortable feeling of dryness in the nose, mouth, and throat. The physiological function of the nose is to warm the inspired air and increase its water vapor content. The increased difficulty of this function is due to the physical changes in the atmosphere incident to altitude. Pilots suffering from deviation of the nasal septum, or hypertrophy of turbinates or of the nasal mucosa, complain very often of extreme distress during flight. Recently a pilot asked the writer to be relieved from flight duty on account of a diseased condition of his nose. He complained of extreme distress while flying. He was one of the oldest and best pilots on the station. Candidates possessing a catarrhal diathesis, or those suffering from bronchitis or any other lung lesion, should be unhesitatingly rejected. Applicants with old chest wounds should be rejected, as in them cardio-pulmonary complications are very common.

A good idea of the functional condition of the lung can be obtained by means of the spirometer. The volume of air breathed

during any period may be definitely determined. The capacity should be from 3 to 3¼ liters. From the point of view of aviation, the spirometer reading is very important.

Bones and joints.—It is well to put the applicant through the several setting-up exercises. These exercises are well known to every one and need no further mentioning.

Vascular system.—The examination of the vascular system is of great importance. All applicants and trained pilots should be refused admission to a flying status if they show the slightest symptoms of a pathological cardiac condition, even if the lesion is compensated and is not accompanied by any marked functional disturbance. The medical officer should not be influenced by the candidate's statement that he has taken many flights at high altitudes and experienced no difficulty. The candidate in question is prone to mention such and such an applicant, about whom the medical officers were doubtful yet eventually passed, who is now an excellent pilot. Applicants for naval aviation are sufficiently numerous to reject those whose hearts are not absolutely healthy. Even when there is no valvular lesion, if the applicant on performing hard work, walking fast, or running shows increased heart action lasting a long time and complains of difficulty in breathing, it is the duty of the medical officer to reject him.

The systolic blood pressure should be taken by the mercury column or by an aneroid instrument carefully corrected as to reliability, and should not exceed 145 mm.; the diastolic should show commensurate pulse pressure. The remainder when the diastolic is subtracted from the systolic should be, roughly, one-half the diastolic figures. For instance:

Systolic	120
Diastolic	80
Remainder	40, which is one-half of the diastolic.

Unfortunately, airmen are frequently encountered who never had the blood pressure taken prior to appointment, and hypertension is noticed on reexamination. Such pilots must be kept under strict observation, especially when flying at high altitudes is carried on. When high tension is elicited, examination by the rebreathing apparatus should be made and its results carefully noted. Some medical men have laid stress on the examination of the blood pressure of pilots while in the air. This examination is undoubtedly of scientific interest, but extremely difficult to perform. Great skill and special instruments are necessary to detect such small variations during ascent and descent with two or more engines making 1,200 to 1,500 revolutions per minute. Most observers have confined their experiments to taking the blood pressure on taking off and on land-

ing. Heart, pulse, and blood pressure examinations of flyers should be made frequently by medical officers on aviation duty. In this way the medical officer will be able to keep himself informed of the functional state of the hearts of the pilots under his care, and to eliminate, at an early stage, those flyers, who develop symptoms of cardiac involvment, which, if not detected, might prove fatal and costly.

Digestive system.—The loss of many teeth or teeth generally unsound, marked overbite, or lack of occlusion of jaws are causes for rejection. There should be at least eight opposing molars, two on each side of each jaw. All defective teeth should have permanent fillings. The abdominal muscle should be rigid. Abdominal affections, particularly those of a chronic dyspeptic nature, should be carefully inquired into, as well as chronic diseases of the stomach. These conditions are, however, very rare in young persons. The examination of all abdominal organs should be the usual examination prescribed for all naval officers. Careful search should be made for any existing hernia.

Genito-urinary system.—It is necessary to adhere to the routine of taking a sample of urine at the beginning of the examination, as it has been found that entire groups of applicants showed transient albuminuria when samples were taken at the end of the examination. The examination of the vaso-motor functions is of great importance, on account of the various outside influences to which the aviator is exposed and which react on it. Under emotional influences, the vaso-motor system produces vaso-constriction (palor) and vaso-dilation (flushing). The intensity of this normal reaction is one of the first indications of the subject's condition. Dermographism should be observed, as it is especially marked in neurasthenics and emotional persons.

Trauma of the head should be carefully inquired into. It often leaves subjective symptoms which persist a long time after the disappearance of the cause, and even after apparently complete cure. The writer believes that applicants who show extensive scars of the head from whatever cause should not be accepted for aviation, as he has personally examined two men with such scars, due to aviation accidents, who showed no abnormal symptoms of any kind at the time, yet the writer afterwards had the sorrowful experience of seeing both of them in fatal seaplane crashes. It is claimed that trauma of the head leaves post-shock symptoms, as well as headache, dizziness, and tendency to rapid physical and psychical fatigue. The extreme nervous tension, the quivering and noise caused by the engine, the shaking of the plane by bumpy air, has a tendency to exaggerate these symptoms and make flying extremely painful and hazardous.

REFERENCES.

1. Air Service Medical. War Department, 1919.
2. Fuchs's Ophthalmology, Duane, fourth edition.
3. Army Regulations No. 40–110, June 20, 1921.
4. The Air Medical Service and The Flight Surgeon, Bauer and McLuke, Military Surgeon, January, 1920.

DEVELOPMENTS IN THE DIAGNOSIS AND TREATMENT OF SYPHILIS.

By L. W. SHAFFER, Lieutenant, Medical Corps, United States Navy.

In the diagnosis of the primary stage of syphilis all authorities are in accord in paying less attention to the clinical characteristics of venereal ulcerations and subjecting all such to repeated dark-field examinations for the presence of *Treponema pallidum*, and if appearances are in the least suspicious, checking negative findings with a series of Wassermann tests over a period of at least three months. In the latter stages of luetic infection the occurrence of cases with negative serological findings, and yet with clinical signs of active syphilis, is teaching the necessity of recognition and greater dependence in diagnosis on the clinical signs, as taught by such masters of clinical syphilography as Fournier and Hutchinson at the end of the nineteenth century. The findings on spinal fluid examination are universally recognized as of the greatest value both in diagnosis and as guides to prognosis and treatment. No case can be considered well treated that has not had at least one spinal fluid examination at some early date in the course of treatment, and another with negative findings before the case can be considered as arrested. Many syphilographers are advising a spinal fluid examination with each course of treatment. Numerous serological and clinical relapses have taught the necessity of the observation of a patient, regardless of the amount of treatment, or the stage in which it began, over a long period, and probably for the rest of the patient's life. There is no certain criterion of absolute cure. The best we can say in any case prior to autopsy is that the process is arrested. This rather gloomy prognosis makes necessary care in diagnosis.

In the treatment of syphilis most authorities separate their cases into five groups: (*a*) Chancre and negative Wassermann; (*b*) chancre and positive Wassermann; (*c*) manifestations of the generalized stage of secondary syphilis; (*d*) ordinary cases of late syphilis; and (*e*) cases with central nervous system or cardio-vascular involvement. It is universally recognized that the best chances of cure are particularly with group (*a*) cases, and with the others less so as each stage is reached. This, then, necessitates endeavor for prompt and early diagnosis by dark-field examination.

Authorities are in accord that mercury still holds its important place in the therapy of syphilis. Its powers are assigned to its immunity building rather than to its spirocheticidal effect. Inunctions and intramuscular injections of the soluble rather than the insoluble salts are more generally recognized as preferable.

Of the more specific arsenicals, weight of opinion favors arsphenamine as the most powerful spirocheticide, and the preparation of choice in treatment of the usual, otherwise healthy, individual. The lower toxicity, the ease of administration, as well as the relatively high chemotherapeutic index, makes neoarsphenamine the most popular in general use. Silver arsphenamine has not as yet been used very extensively in this country. Most reports have been very favorable. With well over a million injections administered and only one very questionable case reported the possibility of argyria must be extremely remote. The results secured compare favorably with arsphenamine.

There is a marked tendency to look more favorably on intramuscular and subcutaneous injections as a mode of administration of the arsenicals. The effects are prolonged through a slower rate of absorption and excretion. It remains for American manufacturers to place on the market a product producing less local reaction after such injections, to encourage its popular use.

The iodides continue to hold their favorable position in the treatment of late manifestations. The tendency is to push larger doses by mouth, and the symptoms of iodism, should they appear, often clear up when larger doses are reached. In those cases in which arsphenamine or mercury is not well tolerated the usual oral administration may be reenforced with sodium iodide by rectal and intravenous injection, often with very favorable results.

The prophylaxis of syphilis with arsenicals intravenously in persons who present no lesions, but who have been definitely known to have been exposed to syphilitic infection, is a procedure in which the reported results have been excellent. In view, however, of the few cases reported the number of injections indicated has not been established. The time since exposure has been taken as a guide, and, if within 48 hours, a single injection would seem ample. As the period lengthens, a progressive increase would be indicated up to that used for abortive cure.

In cases with central nervous system involvement that fail to respond to the usual intravenous therapy, the Swift-Ellis or some modification of this form of intraspinal therapy is indicated. Many men of prominence have been opposed to this form of treatment, but the results secured, at least temporarily, in numerous cases with otherwise hopeless prognosis, makes intraspinal treatment the ap-

roved procedure where facilities in equipment and trained technicians are available.

The tendency since the first widely heralded hope of a complete terilization with, at most, a few injections of salvarsan, has been ward more and more treatment. A negative Wassermann is no nger accepted as the point at which treatment may be stopped and ne case dismissed as cured. Only in group (*a*) cases can there be uch hope of arresting the disease with perhaps a single series of jections. From a single injection the anticipation of cure in the sual case has risen to 20 to 30 injections, at proper intervals, and ith rest periods to conserve the patient's health and prevent the ossible, if theoretical, development of arsenic-fast strains.

The seeming increase in the percentage of cases of lues that develop central nervous system involvement, and the precipitation of arasyphilis earlier in the course of the disease than was common efore the introduction of arsenicals, is now thought to be due to ndertreatment, with main reliance on the powerful but transient ffects of these drugs rather than mercury. More and more consideration is being expressed for the resistance and immunity building owers of the patient. The arsenicals acting as powerful spirochecides probably deprive the body of the presence of treponemata in ufficient numbers to call forth antibodies for its protection. When reatment ceases they are left to multiply without resistance. When rsenicals then are used it should be in the hope of ultimate sterilization. For this reason it is probably better to give no treatment ather than insufficient treatment, and not to begin arsenicals in a ase unless there can be some assurance that the treatment will be arried through to completion.

Although therapy in syphilis has advanced rapidly, especially in he present century, it is still far from being in a settled state. There are differences of opinion in the choice of preparations and he manner of administration of both the arsenicals and the mercurials. The number of injections of the arsenicals and the duration f treatment have been gradually increasing. This has been proven ecessary by reason of our failures. The addition of spinal fluid xamination for therapeutic control, careful observation of patients, oth clinically and serologically, for years after a supposed cure, nd, especially the results of a searching pathological examination t autopsy, have made these failures evident. The application of easures for creating and maintaining the assistance of an immunity echanism are just beginning to be considered. In the present unettled state, it behooves all of us, upon whom the diagnosis and reatment of syphilis may depend, to keep actively in touch with he developments in this great field of medical endeavor.

In the light of our present knowledge it is not believed that an entirely acceptable standard of treatment can be evolved to fit all cases. Complications are continually arising that must of necessity disrupt any smooth-running routine. Yet, it is believed that an outline, recognizing the principles of modern syphilitic therapy, to be applied to the usual cases falling in groups (*a*), (*b*), (*c*), and (*d*), would be very valuable and welcomed by our medical officers. It is not advanced that it must be a fixed proceeding, tending to kill individuality and incentive in those officers who are especially interested in this field, and who wish to apply their own rational ideas. As we all have to treat syphillis, as the rapidity of its evolution, and its ramifications into all fields of medicine, particularly from the diagnostic side, make it a specialty in which few if any of us can hope to become entirely proficient, it is believed that such an outline would benefit the service through systematizing our efforts. It is suggested, instead of a definite system to be rigidly followed, that a board be appointed to draw up an outline to be published yearly in the Bulletin. This outline should cover the general care of patient, the drugs of choice, the details of their administration, the prevention and treatment of complications, the number of courses and rest intervals suggested for each group of cases, and the serrological examinations and when indicated, especially for cases supposedly arrested.

THE FAÇADE OF THE UNIVERSITY OF PADUA AS IT APPEARED AT THE BEGINNING OF THE SEVENTEENTH CENTURY.

From Guzzoni's L'Italia Ostetrica.

HISTORICAL.

THE OLD ANATOMICAL SCHOOL AT PADUA.

By W. M. Kerr, Lieutenant Commander, Medical Corps, United States Navy.

The traveler to-day on his way to Venice who stops for an hour or wo at Padua to take a hurried glance at the paintings of Giotto vhich adorn the walls of the small chapel of La Madonna dell'Arena ees nothing as he treads the narrow streets of that quiet medieval own to indicate how large a space Padua has filled in the intellectual ife of the world. And yet it was once a university city teeming with tudents, a true republic of letters, and a republic of a most demo- ratic kind. Padua is a walled city, located 22 miles west of Venice, n the banks of the River Bacchiglione. Its university is one of the ost ancient in Europe, although it developed so gradually and from ich a modest beginning that it is scarcely possible to assign to it a ate of origin, but it is said that Frederic II, Emperor of the Holy oman Empire, founded it in the year 1222.[1]

The university building faces what is now the Via Otto Febbraio, busy street in the shopping district of modern Padua. It occupies ie entire square between the Via Cassa di Risparmio and the Via an Francesco. The building, originally the palace of the Maltra- ersi, a most noble Paduan family, in 1405 became the property of ie Bonzanini. Padua having come under the domination of Venice, ne of the members of this family let it on a long lease to the Vene- an Signory, who desired to collect into one building the various chools of the university, which were scattered about in different por- ons of the city. This was in 1493.

For some years the building had been used as an inn known as 'Osteria del Bo—the Ox Inn. On account of its comfortable ac- mmodation it became so famed that the name was transferred to ie university, and even to-day the building is better known as the Bo" than as the "Sapienza"—a word meaning wisdom—as the alian university is frequently called.

The exterior of the old palace has undergone changes with the ars. It used to possess two crenellated towers, but one was de- olished long ago. The battlements of the remaining tower were veled and it was converted into a belfry about 1571. In 1603 a

[1] The seven hundredth anniversary of the founding of the University of Padua is to be ebrated this year.

bell was placed in it and later a clock was added. The façade of the building received its present shape between 1591 and 1601, as we learn from a memorial tablet. Its chief ornament is the great portal with two Doric half columns on each side and a broad architrave. A print showing the front of the building as it appeared at the beginning of the seventeenth century may be found in Guzzoni's "L'Italia Ostetrica."

Over the portal was a coat of arms of a doge of Venice—that of Pasquale Cigogna, podesta or mayor of Padua, and doge of Venice from 1585 to 1595. Beneath it was a tablet bearing the lion of St. Mark, a sign of Padua's allegiance to Venice. Both of these have been removed and replaced by the royal arms of Italy. There still remains, however, high on the building, the legend "*Sic ingredere ut te ipso quotidie doctior evadas*," which may be rendered—apply yourself in such a fashion that you become more learned every day.

The portal leads through a large passage to a magnificent courtyard surrounded by a colonnade spanned by a Doric frieze, and by an upper loggia of Ionic columns connected by a marble balustrade. These loggias form two cool and shadowy cloisters in which the students gather to smoke and chat between lectures. A door facing the main portal leads to the "Aula Magna," or the great hall of the university, where lectures are delivered. It is a magnificent chamber at the present time, with a large rostrum, many curving rows of seats, and a richly painted ceiling. The four walls are closely studded with the gilded coats of arms and the crests of former generations of students, hundreds upon hundreds, glistening with gold leaf and animated by countless strange heraldic figures. Here the famous Galileo taught mathematics between 1598 and 1610; his bust may be seen on the wall. He was the first professor to give lectures in the Italian language.

From the ground floor two wide staircases lead to the upper loggia. The walls and ceiling of both these loggias, as well as the great lecture room and the passage leading to the more modern part of the institution, are lined with countless escutcheons or stemmata of bygone prominent graduates. Some of these plaques are frescoed and some sculptured, a few support a marble bust, or an inscription giving the names of the officials of the university, mostly students at the head of the various student corporations which were in existence long ago.

It is curious to notice that as these shields were generally wrought at the same time, a sort of hierarchy is maintained in their disposition, according to the importance of the offices held by the students and their nationality. The hierarchial order is somewhat disturbed in the case of sculptured plaques, which were occasionally removed, pending restoration of the walls, while the painted shields were destroyed or covered over with whitewash. With a few exceptions these plaques

are the work of the sixteenth and seventeenth centuries, and among them may be found memorials of many celebrated personages of the period of the Renaissance.

On the top floor, in the front of the building, is Padua's most interesting exhibit for the medical visitor—the old anatomical arena. It was designed by Alessandro Benedetti and was completed in 1594, at the expense of the Venetian Government, under the supervision of Fra Paola Sarpi. There are six tiers of oval wooden benches with railings rising steeply one above the other. The seats are nearly black with age, cracked and worn by time, and they give a most venerable appearance to the small apartment which is wainscoted with curiously carved oak. The dissecting table is in the confined central space, placed on an elevator by which it may be raised from a room below with the subject in position.

The anatomical lectures in olden times must have been given by candlelight, for the place was so constructed that no daylight could be admitted. It was not until 1844 that the present skylight was placed in the ceiling. Fabricius, he who came from Acquapendente, was probably the first to lecture in this theater, for it was constructed during his professorship. Over the entrance to the room there used to be an inscription commemorating the liberality as well as the genius of Fabricius, who had built some years before, at his own expense, another anatomical theater for the use of his pupils at Padua.

One can not gaze at this old amphitheater without thinking of the stream of eager, aspiring youth which has filled it through the years, the famous men who imparted the results of their anatomical researches to them, the times in which they lived, and the customs of their day.

Padua's great university has ever played the most prominent part in her life, drawing, as it did, for centuries such numbers of the first minds of Europe to its lecture halls. Padua ranks with Florence in the ardor with which she threw herself into the humanistic movement and devoted herself to the revival of the classical ideals and reconstruction of the antique civilization at the time of the Renaissance. The university, receiving students from both sides of the Alps, formed at the beginning of the fifteenth century the center of intellectual culture in Italy; nobles, poets, philosophers, and scientists spurring each other on in the work of research and exploration.

It was to Padua that Petrarch came toward the end of his life; and Torquato Tasso long after, when not yet 17, passed a public examination in canon and civil law, philosophy and theology, with great facility, and to the astonishment of the learned faculty; while Dante, in the course of his wanderings, found at Padua for some years a

congenial residence, obtaining honors and sustenance by lecturing. Here William Harvey spent five years from 1597 to 1602, during which time he studied anatomy under the eyes of his friend Fabricius.

The anatomical school at Padua, during the renaissance, presented opportunities for study greater than any other in Europe. The statutes of the university prescribed that twice during the academical year, which extended from St. Luke's day to the feast of the assumption, on August 15, the whole human body should be publicly dissected twice by the professor of anatomy. Nor were the means neglected to insure the fulfillment of this regulation, for it was provided that if no criminals were executed within the Province of Padua, the university should have the power of claiming bodies from Venice or elsewhere within the Venetian States.

The medical session at the university began on October 18, the day dedicated to St. Luke, the beloved physician, when the assembled professors and students listened to an oration by some doctor or other learned person in praise of the study of medicine and to urge the scholars to its diligent pursuit. The whole assembly then heard mass in the cathedral, after which the litany of the Holy Ghost was said, for in those days people held, in profession at least, to the belief as it is written in the epistle of James, "If any of you lack wisdom, let him ask of God, that giveth to all men liberally and upbraideth not, and it shall be given him."

The laborers of Vesalius, the first and greatest of modern anatomists, and the work of his successor, Fabricius, were largely responsible for the renown of the anatomical school at Padua; but there were other reasons which attracted many students to it, especially those from the British Isles. Padua was the university town of Venice and the religious tolerance which it enjoyed under the protection of the great commercial republic, rendered it a much safer place of residence for a Protestant than any of the German universities or even others of Italy. The city had enjoyed profound peace since the siege of Maximilian in 1509; it was a healthy town and it was a very cheap place to live in, as testified by Montaigne in 1580 and John Evelyn in 1646. Montaigne found that he could live well and in good company for seven crowns a month, fire and lighting excepted, and he gives the low cost of living as one reason why so many students resided there. It might be mentioned, in passing, that the heating of his room was a constant source of trouble to Montaigne. Charges for a fire were high in those days; and even when the service was well paid for and satisfactory, his writings show that he was apt to grumble about it; so his remark about the fire and lighting of the inns at Padua may not mean so much after all.

The universities of Europe have always been of two types—one ruled by the faculty or masters of arts, like that of Paris; the other controlled by the undergraduates. The university at Padua was of this type, and the matriculant during the early years of the renaissance followed a course of instruction mainly directed by the students themselves, for they then had the power of electing their own teachers. Under the laws of Venice the university at Padua was governed by a board of three patricians, called the "Riformatori dello Studio de Padova."

The students were enrolled, according to their nationality, into a series of "nations." Each nation had the power of electing one, and in some cases two, representatives—Conciliarii—who formed, with the rectors, the executive body of the university.

The rector was at the head of the student confederation or nation, of which there were several at Padua, such as that of the Italians, the French, the Provençals, the Germans, the English, and the Scotch. He was chosen from among the students and it was required that he possess an unimpeachable reputation, should be at least 22 years of age, and should have lived for a year in Padua upon his private means. The office of rector was biennial, the electors being the past rectors, the councilors, and a great body of special delegates. The voting was by ballot, a Dominican priest acting as the returning officer.

The installation of a rector was a most magnificent ceremonial. The ceremony took place in the cathedral in the presence of the whole university. Here the rector-elect was solemnly invested with the rectorial hood by one of the doctors, and he was then escorted home by the whole body of students, who expected to be regaled with wine and cakes. Originally a tilt or tournament was held, at which the new rector was required to provide a certain number of spears and gloves for the contestants, but this practice was discontinued early in the history of the university. A remarkable custom which persisted for some years permitted the students to tear the clothes from the back of the newly elected rector, who was then called to redeem the pieces at a high rate. So much license attended the ceremony that a statute was passed in 1552 to restrain "the too horrid and petulent mirth of these occasions," but it did not venture to abolish the time-honored custom of the "vestium laceratio."

Among the privileges which the Venetian senate conferred upon the rector was the right to wear a robe of purple and gold, while upon the end of his term of office the title of doctor was conferred upon him and he was presented with the golden collar of the Order of St. Mark.

The old matriculation registers of the university are still in existence and are carefully preserved at Padua. Up to the end of the sixteenth century each entry in the register is accompanied by a note

of some physical peculiarity as a means of identifying the student. Thus, "D. Henricus Screopeus, Anglus, cum naevo in manu sinistra, die nona Junii, 1593." (Mr. Henry Scrope, an Englishman, with a birthmark on his left hand, matriculated June 9, 1593.)

"Johannes Cookaeus, Anglus, cum cicatrice in articullo medii digiti, die dicti." (John Cook, an Englishman, with a scar over the joint of his middle finger, [matriculated] on the same day, [June 9, 1593].)

Before the period of the renaissance, medical minds were "all under the ban of Authority and Galen was an object of almost veneration." All reasoning was formal and deductive. There was neither inductive reasoning nor experiment. Nature was never questioned for her secrets. The renaissance was truly an awaking in every department of knowledge and along every line of study. As Roswell Park has said, "it was as if the minds of men had been dormant and lost their power of receptivity, and after a long period of torpor awakened to a new atmosphere amid new surroundings; as if there had burst upon them a sudden appreciation of ability to do things hitherto undreamed of and to acquire knowledge such as hitherto had been possessed by none. Once free from the shackles imposed by authority of the past, these minds severed their Gothic bonds and started forth in every direction with the ardor of youth and the interest of novelty, all engaging in the general enterprise of erecting from the débris of antique science a new temple to the mind in which to worship. While some delved among the records of the past, others sought to bind the past with the present, and others bolder yet cut entirely loose from it, rejected all tradition, and would fain have built this temple with entirely new materials." Of such were the early medical teachers at Padua.

Among the first we encounter when reviewing this period is Niccolo Leoniceno (1428–1524), professor of medicine at Padua. He was an elegant Latinist and made a noted translation of the Aphorisms of Hippocrates, and toward the close of his life had even begun an accurate Latin translation of the works of Galen. He also wrote one of the earliest Renaissance tracts on syphilis (1497), but his chief service to science, as may be read in Garrison's History of Medicine, lay in the difficult task of correcting the botanical errors in the Natural History of Pliny. In Leoniceno's day this was a feat of the rarest intellectual courage. Hermolous Barbarus, an earlier commentator had already corrected some 500 orthographic and grammatic blunders perpetrated by the copyists of Pliny's manuscripts, but to assert that Pliny himself could be fallible in his statements of fact savored of rankest heresy, for his writings, like those of Galen and Aristotle, were regarded as sacrosanct and unimpeachable. Accordingly when Leoniceno published his little tract on the errors of Pliny (1492) a

violent storm of controversy broke loose over his head. But he was able to prove his point and thus cleared the way for the later German botanist-commentators who are considered the "Fathers of Botany," namely, Otho Brunfels (1464–1534), of Mainz; Leonhard Fuchs (1501–1566), of Tübingen; Hieronymus Bock (1498–1554), of Heidelberg; and Varlerius Cordus (1515–1544), whom botanists revere as the Marcellus of their science.

One figure looms large in the history of medical education at Padua—that of Andreas Vesalius (1514–1564) who was destined to become the most commanding figure in European medicine between the times of Galen and Harvey. He was born at Brussels, of German parents, who had come from Wessels on the Rhine—whence the name "Vesalius." He studied at the University of Louvain, where he received in early youth, a thorough training in the Latin, Greek, and Arabic languages and also in mathematics. At the age of 18 he visited Montpellier and then went to Paris, where he received instruction in anatomy from that bigoted Galenist Jacques Dubois (1478–1555), whose name is sometimes Latinized into Jacobus Sylvius—that old miser, but prince of lecturers, who is said to have warmed himself in the depth of a Parisian winter by playing handball against the wall of his room rather than to be at the expense of a fire.

The instruction in anatomy given in Paris at that period (about 1533) consisted in comments on and interpretations of Galen's teachings, in dissections of some of the lower animals, and in occasional demonstrations of the easily accessible parts of a human cadaver. Dissection for teaching purposes at this time was still hampered by the theologic idea of the sanctity of the human body and its resurrection; hence material for anatomical study was difficult to obtain. It is said that Vesalius frequented the places of public execution and intrigued with the executioners for the remains of criminals. Dubois, noting the interest which his pupil took in anotomy, and recognizing his fitness for imparting instruction, assigned him the special duty of repeating in the lecture room before his fellow students the essential facts of the day's instruction.

At the age of 23 Vesalius accepted from the Senate at Venice the appointment of the professorship of anatomy at Padua. Here he began to feel considerable uncertainty as to the correctness of the teachings of Galen. The stock of anatomical knowledge which had been accumulating as the result of his own careful dissections made him skeptical of the old authorities. His mind was too active, his spirit too keen and independent to ponder long on the dust of the ages, and he soon established a reputation for first-hand knowledge of the dissected human body, and it was he who made anatomy what it is to-day, a living, working science.

The outcome of his work at Padua was the publication of the magnificent *De Fabrica Humani Corporis* which was printed in June, 1543, by Oporinus of Basel and beautifully illustrated by Johan von Calcar, a pupil of Titian—a book which marks the breaking with the past and the casting off of Galenical tradition.

In his book Vesalius does not spare his scorn and the violence of his language in dealing with Galenical and other superstitions which prevailed in his time. Strange to say the book has never been translated into English, although it was the work which disposed of Galen's osteology for all time, and, indeed, re-created the whole gross anatomy of the human body. Ambroise Paré, however, made the "Fabrica" popular and accessible to the surgeons of his country by writing an epitome of it in the vernacular of France.

In referring to the book Garrison says: "However scornful and truculent in his general onslaught against superstition, Vesalius displays the airy skepticism of a man of the world in dealing with these teleologic points so dear to medieval theologians. For instance, touching the Galencial crux that the blood passes through certain hypothetical pores in the ventricular septum, he says, 'We are driven to wonder at the handiwork of the Almighty, by means of which the blood sweats from the right into the left ventricle through passages which escape the human vision!'"

The surprising ability of Vesalius is seen not only in his thorough descriptions of such parts as the eye, the ear, the nose, the accessory sinuses of the nose, the pituitary body, or the pelvic cavity, but in his clean sweep of the whole subject.

When men in the course of years have come to consider certain beliefs and ideas as settled truths, it comes as a painful shock to be told that these beliefs are erroneous and that new ones must take their place. This is what happened when Vesalius's book was first published, and the effect was immediate. Du Bois, his old friend and teacher, turned against him with acrimony and coarse abuse. In a pamphlet which he published in Paris in 1551 he even went so far as to refer to his former pupil as "a crazy fool, who is poisoning the air of Europe with his vaporings." To Vesalius's credit it may be said that he made no reply to these attacks, partly on account of their former pleasant relations and because Du Bois was at that time an old man; but, as Buck tells us, when Bartholomeus Eustachius, professor of anatomy at Rome, a celebrated anatomist of that period, and a man of his own age, entered the lists as the champion of Galen, Vesalius took up the challenge, left the work upon which he was engaged, and began a tour of visits to the universities of Italy for the express purpose of disproving, by the aid of numerous dissections, the statements made by his adversaries. Everywhere he went he was

received with enthusiasm, the older men among the teachers of anatomy striving with the younger to manifest the strength of their approval. In spite of this vindication, an undercurrent of ill feeling set in against him, and in a fit of indigation he burned his manuscripts and left Padua to accept the lucrative post of court physician to Emperor Charles V at Madrid.

The anatomical researches of Vesalius thus came to an end, but it is possible that in 1556 he lent his influence to the advancement of the subject by prompting Charles V to refer the question of the propriety of dissecting human cadavers to the theological faculty of the University of Salamanca for an authoritative opinion. The reply which these broad-minded theologians gave was most satisfactory: 'The dissection of human cadavers serves a useful purpose and is therefore permissible to Christians of the Catholic Church," and it is fair to assume that scientific research in human anatomy acquired greater freedom of action largely as a result of this famous decision.

Vesalius's treatise on human anatomy was soon discovered to be deficient in certain particulars. Some of the descriptions were incomplete, and there were a number of parts or organs for which no descriptions whatever had been provided. Many of these deficiencies were supplied by his pupils or other contemporary anatomists.

One who at Padua had been Vesalius's pupil, then his colaborer—Realdus Columbus (1490–1559), born at Cremona—succeeded him as professor of anatomy. Columbus criticized, in some respects, the statements of his eminent predecessor, which he could better do, since he is said to have dissected 14 bodies every year. He is said to have come so near to discovering the mystery of the circulation that it is strange how he could have missed it. He even appreciated the systole and diastole of the heart and the connection thereof with dilatation and contraction of the arteries. He also knew that the pulmonary veins conducted arterial blood and that the pericardium was a closed sac. He even appreciated the lesser circulation, since he described how the blood left the right side of the heart and passed into the lungs and came back through the veins into the left ventricle; because of this discovery, says Park, and in spite of his utter failure to appreciate the greater circulation, he has been regarded as entitled to the credit which is universally given to Harvey. From Padua Columbus was called to Pisa, and then to Rome, where he died.

The ideas of Vesalius were sustained by his pupil Gabriele Fallopio or Fallopius (1523–1562), who was born in Modena, in northern Italy, and who when he was only 24 years of age was appointed professor of anatomy at Ferrara. Subsequently he taught at Pisa, but at the time of his death he was professor of anatomy and botany at Padua. He made many important discoveries in anatomy, and his

name has been perpetuated in connection with the Fallopian tubes. He had a kindly disposition and was much liked by his pupils. He published one book, "Observationes Anatomicae," printed in Venice in 1561.

Fallopius was succeeded at Padua by his pupil Hieronymus Fabricius (1537–1619), who was born in Aquapendente, a small city of Etruria, near the southern end of the Appenines. He is often spoken of as Fabricius ab Aquapendente to distinguish him from a German anatomist, Fabricius of Hilden, born at Hilden, near Dusseldorf, in 1560.

Fabricius was eminently successful as a dissector and anatomical demonstrator. In 1565 he was appointed professor of surgery with the understanding that he was to continue giving his demonstrations in anatomy. These professorships were not mere titles of honor, but were lucrative positions, for in addition to the fees paid by the students the different chairs were well endowed. The annual stipend of the professor of medicine at Padua was 1,000 florins, a sum equal to $5,000 at the present day. Fabricius as demonstrator of anatomy received 500 florins, while as professor of anatomy and surgery combined he received more than double that sum. He contented himself with this stipend and refused the large sums which his great reputation as a surgeon placed at his command. As he was one of the most learned, so he was one of the most honored teachers of his day; in fact, he is spoken of as being one of the glories of the Italian school of medicine.

Pupils came in flocks from all parts of Europe to attend his lectures and among them were some who, like William Harvey, afterwards attained great celebrity for the effective work which they did in advancing the science of medicine. Fabricius was more than a teacher to Harvey, for a firm friendship seems to have sprung up between them. Fabricius—then a man of 61, he lived to be 82—was engaged during Harvey's residence in Padua in perfecting his knowledge of the valves of the veins. The valves had been known and described by Jacques Du Bois, but the work of Du Bois had fallen into oblivion and Fabricius rediscovered the valves in 1574 and demonstrated their presence in all the veins of the extremities. His observations were not published until 1603, when they appeared as a small treatise "*De Venarum Ostiolis.*" There is no doubt that he demonstrated their existence to his class, and that Harvey knew of the treatise, though it was published a year after he had returned to England. Indeed, as Osler said, when we look at Harvey's work, much of it appears to be a continuation and an amplification of that done by Fabricius. Both were intensely interested in the phenomena of development; both wrote upon the structure and func-

tions of the skin; both studied the anatomy of the heart, lungs, and blood vessels; both wrote a treatise "*De Motu Locali.*" Harvey's youth, his comparative freedom from the trammels of authority, and his more logical mind, enabled him to outstrip his master and to avoid the errors into which he had fallen. This advance is particularly well seen in connection with the valves of the veins. Fabricius taught that their purpose was to prevent overdistension of the vessels when the blood passed from the larger into the smaller veins (a double error) whilst they were not needed in the arteries because the blood was always in a state of ebb and flow. It was left for Harvey to point out their true use and to indicate their importance as an anatomical proof of the circulation of the blood.

"But," says Buck, "Fabricius was not merely a good anatomist and physiologist, he was also a most distinguished surgeon and general practitioner. From far and near patients came to consult him about their ailments, and he appears to have been immensely popular among all classes of the community. His home, situated on the River Brenta, just outside the city of Padua, was most attractive and it was there that he dispensed hospitality in a princely fashion. One of his peculiarities was that in many cases he was unwilling to accept a fee for his services. As a natural result, gifts of all sorts, many of them of considerable value, were showered upon him. He devoted one of the rooms of his residence to the purposes of a cabinet or museum, in which all those gifts which were suited to such display might be properly exposed to view, and over the doorway of the room he placed this inscription 'Lucri neglecti lucrum.'" This description Doctor Buck renders into English by the following: "Costly gifts representing unproductive wealth."

Fabricius never married, and at the time of his death, May 21, 1619, his fortune, which he bequeathed to his brother's daughter, amounted to 200,000 ducats—a very large sum in those days.

Fabricius had taken into his household a poor boy—Julius Casserius (1545–1616), a native of Piacenza. The lad showed ability and Fabricius taught and trained him to follow in his footsteps; so from a servant he became pupil, from pupil friend, then colleague of Fabricius, and last of all his successor in the chair of anatomy at Padua. Casserius projected a large work on anatomy with beautiful engravings—his "*Tabulae Anatomicae*," and he employed two distinguished artists, Edoardus Fialettus and Franciscus Valesius, to draw and engrave his preparations. He never saw the completed work, for death overtook him before the task was finished. Garrison tells us that a wonderful union of scientific accuracy with artistic perfection was attained in this production "whose 'eviscer-

ated beauties,' as Doctor Holmes has styled them, are as attractive in appearance as their dissected parts were held to be instructive to the student." These matchless plates of Casserius were incorporated in the atlas (1627) of Adrian von Spieghel (1578–1625) or Spigelius, who wrote the letter-press around them, and in this way is usually credited with the exquisite workmanship of the illustrations. Casserius was succeeded in the chair of anatomy at Padua by Spigelius, whose name has come down to us associated with the Spigelian lobe of the liver.

Among other distinguished men of Padua must be mentioned Mercurialis and Mercurius. Mercurialis (1530–1606) was born at Forli in the Romagna in 1530, about 10 years before Mercurius (Scipione Mercurio), with whom he is sometimes confounded. He taught at Padua for 18 years, was created a Knight of St. Mark, and amassed a fortune of 120,000 golden crowns. His most celebrated work is "*De Arte Gymnastica*," 1569. He wrote an important work, "*De Morbis Muliebribus*," which was published in the collection of all the ancient and modern works on obstetrics and gynecology entitled *Gynoecia*, the third and most complete edition of which was published by Israel Spachius in 1597.

Mercurius (Scipione Mercurio, 1540–1616) was born in Rome and studied medicine at Bologna and Padua, but soon devoted himself to theology and entered the Dominican monastery at Milan, where he took the name of Hieronymus. He still continued to occupy himself with the study of medicine, and, finding his monastic life did not afford him sufficient opportunities for the practice of medicine, he left the monastery and traveled in France and Spain in the years 1571 and 1572 as physician to a German officer. On completing this service he returned to Italy, practiced with great success in Padua, and settled in 1601 in Venice, where he lived for 15 years. He wrote "*La Comare o Ricoglitrice*," the first Italian work on midwifery. The first edition was published in 1596 and is very rare, only four copies being known to exist—three in Italy and one in England. It contains chapters and illustrations of Caesarean section on the living patient, which operation he reintroduced into Italy. In this work Mercurio is the first author to mention contraction of the pelvis as an indication for Caesarean section. Caesarean section had long been performed on the dead in Italy, for a law of the Roman church prescribed "if a pregnant woman die the fetus shall be cautiously extracted as soon as possible, and if alive shall be baptised."

This briefly is the story of the old anatomical school at Padua, and as we think of the brilliant light which has spread from the time-worn anatomical theater on the top floor of the university building

and illuminated the pathway of knowledge of the human body, we recall the lines of Shelley:

In thine halls the lamp of learning,
Padua, no more is burning.
Once remotest nations came
To adorn that sacred flame;
Now new fires from antique light
Spring beneath the wide world's might.

REFERENCES.

Italy and the Italian, by Edward Hutton.
Plain Towns of Italy, by Egerton R. Williams.
The Story of Padua, by Cesare Foligno.
Harveian Oration, 1921, by Herbert R. Spencer.
Harveian Oration, 1916, by William Osler.
Harveian Oration, 1874, by Charles West.
William Harvey, by D'Arcy Power.
History of Medical Education, by Theodore Puschmann.
Montaigne and Medicine, by J. S. Taylor.
History of Medicine, by F. H. Garrison.
The Growth of Medicine, by A. H. Buck.
History of Medicine, by Roswell Park.

EDITORIAL.

ON CARBON MONOXIDE ASPHYXIA.

One can scarcely fail to be impressed by the number of articles appearing in recent literature concerning carbon monoxide in relation to the human economy, as well as by the prominence of their authors. All phases of the subject are considered, but the important advances in our knowledge lie particularly in the fields of mechanism of action, methods for quantitative estimation of carbon monoxide in the blood, and considerations of prophylaxis and treatment. The articles quoted below will also furnish an excellent bibliography for those who may desire to further pursue the matter.

Of course, we have always had this problem with us—inefficient ventilation combined with mining operations, industries utilizing blast furnaces or other devices for combustion on a large scale, illuminating gases, and even on a smaller scale in the home with its ranges, furnaces, kerosene heaters, gas jets, etc. Modern warfare also has its casualties due to the carbon monoxide resulting from gunpowder and other explosives, the vast majority of cases occurring in the Engineer units, almost exclusively among those engaged "in tunneling and other duties connected with underground warfare," as noted by W. J. Rutherfurd ("Carbon monoxide poisoning in warfare." Lancet, 1920, I, 184). The importance of the question to the Navy, engaged as it is in extensive industrial pursuits, is obvious.

H. S. Forbes ("A survey of carbon monoxide poisoning in American steel works, metal mines, and coal mines." Jour. Indust. Hygiene, 1921, III, 11), in an excellent résumé of this phase, draws the following conclusions: "Carbon monoxide as met with in metal and coal mines and about blast furnaces in this country rarely causes late after effects following acute severe gassing. When such effects do appear, there is evidence almost always of a preexisting pathological condition. Frequent exposure to carbon monoxide causes headache and malaise, but no evidence has been found of a cumulative harmful effect. As was to be expected, owing to the compensating increase of hemoglobin and red cells from prolonged oxygen want, it is possible to acquire some tolerance to carbon monoxide."

The development of the gas engine, however, and its constantly increasing use in military as well as in civilian pursuits, will not permit us to drop the matter at such a point. The daily press affords

to us frequent evidence of the dangers of a running engine in a closed garage. Our nose and eyes will tell us that this problem is probably also present in lesser degree in almost any large city. On a windless day the streets carrying heavy traffic are usually filled with a distinct haze of exhaust gas. Intermediate stages are easily conceived.

The building of a tunnel for vehicular traffice between New York City and Jersey City and beneath the Hudson River (involving distances of more than 3,300 feet between ventilating shafts and a total length of about 8,500 feet between portals) has brought up the question in acute form. The result has been an instructive article by Henderson and others (Henderson, Y., Haggard, H. W., Teague, M. C., Prince, A. L., and Wunderlich, R. M. "Physiological effects of automobile exhaust gas and standards of ventilation for brief exposures." Jour. Indust. Hygiene, 1921, III, 79, 137). They tell us (quoted by Public Health Report of September 9, 1921, XXXVI, 2215) that a car, while warming up, may be expected to give off about "1 cubic foot of carbon monoxide per minute," and, "in a closed room 10 by 10 by 20 feet the atmosphere will, apart from diffusion, reach the dangerous concentration of 15 parts in 10,000 in three minutes." They draw certain conclusions from their work and define general standards for ventilation (based upon length of brief exposures). "When the time in hours multiplied by the concentration of carbon monoxide in parts per 10,000 of air equals 3, there is no perceptible physiologic effect. When it equals 6, there is a just perceptible effect. When it equals 9, headache and nausea are induced. When it equals 15 or more, the conditions are dangerous to life. If the volume of breathing is increased by exercise (even by slow walking, and correspondingly more by physical work), the rate of absorption of carbon monoxide is increased proportionally. After return to fresh air, the elimination of carbon monoxide through the lungs proceeds at a rate of 30 to 60 per cent reduction of the blood saturation per hour. In the exhaust gas from gasoline, carbon monoxide is the only considerable toxic constituent. In the exhaust gas from coal distillate (benzol, etc.), and in illuminating gas, there are present accessory toxic substances."

Recent work also supports the general belief that the harmful effects of carbon monoxide are not due to an actual toxic action, but are caused by the anoxemia resulting from the formation of carboxyhemoglobin. H. S. Forbes and L. Hompe ("Carbon monoxide, illuminating gas, and benzol: Their effects on blood coagulation time." Jour. Indust. Hygiene, 1921, III, 213), from experiments upon cats, conclude that gassing with these substances has "no measurable effect upon the coagulation time," and "no evidence of hemolysis or of blood destruction was observed." H. W. Haggard ("Studies in carbon monoxide asphyxia. I. The behavior of the heart." Am. Jour.

Physiol., 1921, LVI, 390) found that death was due to respiratory failure, the sequence of events being anoxemia, excessive breathing, excessive loss of carbon dioxide, respiratory failure. He also considered the heart, and found "no direct toxic action of carbon monoxide upon the cardiac conducting system. Respiratory failure, however, increases the anoxemia, and then the various stages of heart block rapidly develop; respiratory failure also results in an increased acidity (decreased alkalinity) of the blood, stimulates the cardioinhibitory center, and causes a temporary cessation of auricular activity.

The article by H. W. Haggard and Y. Henderson "Respiration and blood alkali during carbon monoxide asphyxia." Jour. Biol. Chem., 1921, XLVII, 421) is a recent statement relative to the acid-base equilibrium in this condition. It has been abstracted for a recent issue of the BULLETIN. They determine the sequence of events to be anoxemia, increased respiration, acapnia and alkalosis (pH increased due to decrease in hydrogen-ion concentration and H_2CO_3: $NaHCO_3$ ratio), compensatory loss of alkali from the blood, terminal slowing of respiration, and acidosis due to retention of carbon dioxide or at least a tendency toward acidosis. This final increase in hydrogen-ion concentration may terminate in death, or, if intake of carbon monoxide cease, be restorative and end in recovery with recalling of alkali to the blood. Thus the condition is genetically an alkalosis, rather than an acidosis—the lowering of blood alkali being compensatory, and any increase in hydrogen-ion concentration being premortal or restorative. They consider that any acids formed, such as lactic acid, do not cause acidosis, but assist in neutralizing the alkalosis. This is in opposition to the long-accepted belief that the condition is a typical acidosis due to incomplete combustion in the tissues resulting in organic acids that directly and viciously attack the blood alkali.

The work of Henderson and collaborators (see above) supplies standards of ventilation. Additional aid in prophylaxis lies in a respirator perfected by the United States Chemical Warfare Service. Forbes (see above) states that it is effective "even at zero degrees against 1 per cent of carbon monoxide. Its life is approximately three hours. Information in regard to it can be obtained from the Director of the Bureau of Mines, Washington, D. C." This service has also perfected a portable detector, which is sensitive to 0.5 part of carbon monoxide in 10,000 (Hoover, C. R. "The detection of carbon monoxide." Jour. Indust. and Engin. Chem., 1921, XIII, 770).

The important new step in treatment consists in the administration of a mixture of carbon dioxide and oxygen. The rationale of this treatment is evident from Haggard and Henderson's work relative

to the acid-base equilibrium (see above)—restoration of lost carbon dioxide and recalling of alkali to the blood and augmentation of respiration. It is based upon their work (Henderson, Y., and Haggard, H. W. "The elimination of carbon monoxide from the blood after a dangerous degree of asphyxiation and a therapy for accelerating the elimination." Jour. Pharmacol, and Exptl. Therap., 1920, XVI, 11) upon dogs, in the course of which it was found that oxygen with 6 to 10 per cent of carbon dioxide would free the blood of carbon monoxide in 15 to 20 minutes, even when the hemoglobin was 60 to 80 per cent saturated. This is another example of the use of carbon dioxide as an efficient therapeutic agent in conditions that are acapnial in origin, and along the same line as the work of these men, together with Coburn (Henderson, Y., Haggard, H. W., and Coburn, R. C. "The therapeutic use of carbon dioxide after anesthesia and operation." Jour. Am. Med. Assoc., 1920, LXXIV, 783), in which they found decided "beneficial effects on men in the depression following etherizations, in which condition acapnia is also a factor." Another point developed by Haggard in his work relative to cardiac behavior (see above) was that atropine prevents the temporary cessation of auricular activity.

Van Slyke and Stadie (Van Slyke, D. D., and Stadie, W. C. "The determination of the gases of the blood." Jour. Biol. Chem., 1921, XLIX, 1) have further perfected and simplified the technique for estimation of carbon monoxide in the blood, the method having been originally promulgated by Van Slyke and Salvesen in 1919. It may interest the heavy tobacco smoker to know that they quote H. Hartridge (J. Physiol., 1919–20, LIII, p. lxxxii) as having found as much as 1 volume per cent of carbon monoxide in the blood of one such. (C. W. O. B.)

ON THE HABIT OF READING.

One winter day Mr. A. Edward Newton, he of the "Amenities of Book Collecting," was sitting in a smoking car reading when a man whom he knew slightly asked him if he would not like to sit into a friendly game of poker. Mr. Newton made known to him briefly that he did not know one card from another. Then the man said, "Let us talk," which meant let him talk; and talk he did, about everything and nothing, until finally he asked Mr. Newton if he had received any Christmas presents. This gave Mr. Newton a chance to boast of his wife's generosity and to show a new watch which she had given him, with the result that the acquaintance countered by saying that his wife had given him a fine antique bookcase.

"How very nice," said Newton. "Are you fond of books? Have you many?"

"No; not many," he replied, "but it isn't exactly a bookcase; it's more like a large, upright writing desk. The top is a closet with glass doors with a red silk lining; makes a nice place to keep whisky and cigars and things under lock and key." (This was before we had discovered the necessity of keeping our whisky in a burglar-proof vault.) "Then there's a flap that lets down, on which you can write; and underneath is a place for books. And do you know," he continued, "I know enough books already, I'd like to have, to fill both shelves."

Newton shuddered, for he is one of the foremost book collectors in the country, and better to conceal his anguish he asked his companion if he enjoyed reading.

"Very much," he said. "I don't know anything I like better than to go into my den on Sunday morning after breakfast and sit and read my newspaper undisturbed."

Think of a man staring vacantly at a Sunday paper, under the delusion that he is reading. Yet how many confine their literary excursions to the newspapers and magazines.

Sir Robert Firth, writing in the Journal of the Royal Army Medical Corps of December, 1921, comments on the habit of reading in the following delightful passages:

> Few will be able to gainsay that the act of reading is a necessity in modern society, but the picture of rows of men and women immersed deeply in newspaper or book, which presents itself each morning and evening as I make a daily pilgrimage into town, suggests often the thought to deplore the invention of writing and printing. Were not men happier and no less wise in the olden days when every male was sowing or plowing, hunting or fishing, and every woman busy in dairy or kitchen, or with distaff and spindle, from early morn till eventide? There, indeed, after they had eaten and drunk their evening meal, it did them all the good in the world to listen to some itinerant story-teller or minstrel extolling the manly deeds of bygone heroes. There were no intellectuals then to entangle men in the webs of politics or social and other theories, but everyone learned by experience both the ways of nature and of other men. Doubtless that was so for the greater number, but even in the simplest civilizations there arise a limited few who acquire and are the repository of a wisdom and knowledge more subtle than can be gathered by any unlettered person, and in the days when the ordinary man did not need to specialize the holders of wisdom acquired by study were the specialists in knowledge. But now, when everyone must specialize, some wisdom only to be acquired by letters is a necessity for everyone. Unfortunately, however, letters have become so easy a medium that unwisdom as well as wisdom is daily propagated by their means; nor is that all, because reading, which should be at once a study and a delight, has become for many little better than a drug. A narcotic literature of emotion-stirring facts and ill-digested theories is the product of many of our printing presses, and the evidence of that debasement of literature which is the price we pay for the widespread of letters.
>
> Notwithstanding, there is no need for pessimism; since, with patience, the balance sheet may be improved by more inspired methods of education, raising the tone of literary digestion. In this matter there is hope for every man

and every advance in a literary diet is permanent. As with the body, so with the mind, early training is all-important, and the standard of reading of the next generation of adults will improve in proportion as the feet of the children of this generation are set firmly on the road to humanism, or that quality of the highest part of the human soul to which great literature appeals, as distinguished from the practical or the purely intellectual. But, to be successful, this scheme of mental training must not be passive; for the reader, like the listener to music, benefits according to the intensity of his own cooperation. It is a question of method rather than of technique, and a sound method inspired by a philosophical aim is the ideal. It is not too much to say of any young person who reads at all that what he or she reads in youth molds the mind for the rest of life, even if they never afterwards return to the particular study. Certain nice points arise, such as: What due should be paid to knowledge? What to curiosity? What to entertainment? And how far historical breadth of view or philosophical depth is the better principle to follow? These questions will be solved by different temperaments in different ways; but, whatever be the road, there can be no doubt that the student should be armed with a strong critical sense. This sense has never been more urgently needed than now, when an intolerable clamor echoes still through civilization and the calm voice of wisdom is not heard. Criticism embodies experience, and experience only comes with years, but that strong critical sense which should grow as the mind matures must necessarily be sown in youth. It is no less valuable than the training in logical scrutiny given by a scientific education, and a mind equipped with either is armed indeed. A danger lurks, however, by the way, and it is overestimated enthusiasm in each or some new literary pasture attacked, with the result that there is neither a master of literature nor a critical sense, but merely an enervated palate to be stimulated only by something new and well flavored. A mind so unwisely satiated is a damaged intellectual machine, and far removed from the reasonable being with an infinitely varied garden of literary fruits at its disposal, from which it can select according to its mood and constitution. To put the mind in possession of such a desirable garden is, or should be, the true aim of education in literature. The essential tool for its cultivation is criticism, and the young student should be encouraged to use it.

Then there is the case of the old man or woman whose enthusiasms have sobered down, and who has probably formed a nucleus of his literary garden. What is he or she to read? It is, of course, largely a matter of temperament in what direction such a person will turn for literary recreation, but it is also a matter of training and environment in early years. Some will seek relaxation in a return to Virgil, Horace, or Homer; some will prefer to drink from the deep well of English poetry; some will find biographies and books on travel more suitable to their taste; while many others will revel in a highly flavored detective story. I know many excellent people who are examples of each of these groups, and also I know some who, although they have good libraries full of works by the best authors, constantly complain that they have nothing to read. I often wonder at the cause of this, and have come to the conclusion that in many cases there exists a psychic complex, started far back in youth, when what should have been an enjoyment was turned into an unpleasant task simply because it was presented in a dull way and commented on tediously. To such people the reading of a classic work is frequently a real penance, because the good books compel weak minds to think and create an unaccustomed exercise. The lesson is that the mind, like the body, needs to be kept in good training, not always tense but always supple. Most of us have gaps in our literary geography, but we generally keep them to ourselves in shame. I

onfess that it is only within recent years that I have read Chaucer and penser, and I am not a young man. Doubtless there are many others like yself. The fact is we should plan and carry out each winter a series of hort literary cruises, returning after each one to familiar waters, to old riends, or to the children of to-day whom we can not afford to neglect. Above ll things, we must not put on too much sail in these literary voyages; we may ush through or skim a modern book, but with an old author we must go lower if we wish to penetrate to the levels of his mind and to reconstruct the ommon intelligence which he addressed in his day. Unless we surrender our motions, it is useless to read at all; on the other hand, if we let our emoions hurry us on too fast, the memory of our voyage will be blurred or even nrecorded. The camera of the mind may be focused by emotion, but understanding is the lens through which the image is impressed on memory. If we urn over the leaves of our mental records, it is melancholy to note how many of our pictures of past literary excursions are wanting in sharpness of definion. It is by the spark that is within us that we read literature, and not all the ire of God that was in Dante, Goethe, or Shakespeare can control the little spark that is in each one of us who read and respond to the messages which hose writers bring home to all who can or care to think.'

SUGGESTED DEVICES.

THE METHOD OF PREPARING COLLOIDAL GOLD SOLUTION USED AT THE UNITED STATES NAVAL MEDICAL SCHOOL.

By J. Harper, Lieutenant, Medical Corps, United States Navy, and C. Schaffer, Chief Pharmacist, United States Navy.

Solutions required:

(1) Gold chloride (Merck's)	1	gram.
Water, triple distilled, qs	100	c. c.
(2) Potassium carbonate	2	grams.
Water, triple distilled, qs	100	c. c.
(3) Formaldehyde solution	0.5	per cent.

In a 2-liter Erlenmeyer flask place 1,000 c. c. of triple-distilled water. (A large flask facilitates vigorous agitation at the end of the procedure.) Immerse flask in large water bath. A suitable bath may be improvised by using an ordinary galvanized-iron bucket in the bottom of which is placed a metal-gage screen with 1-inch turned-down sides. The flask rests upon the gage support and the water in the bath is brought to the level of the water in the Erlenmeyer flask. Place a Bunsen burner under the bath and rapidly heat until the contents of the flask reach 60° centigrade. Shake flask occasionally during heating. Remove the flask and add from a burrette 7 c. c. of a 2 per cent potassium carbonate solution. Shake well and add while shaking 10 c. c. of a 1 per cent gold chloride solution delivered from a 10 c. c. pipette. Shake thoroughly and again place in water bath, bringing contents of the flask to 92–95° centigrade. After reaching this temperature, remove from bath, shake thoroughly, and add while shaking 4.5 c. c. of 0.5 per cent formaldehyde solution. Continue to agitate vigorously until the solution passes through a deep amethyst to a red color. The finished solution must be transparent and of a deep red color when examined in transmitted light, and by reflected light should have a slight brown shimmer or metallic appearance. This is the final product and it should conform to the following requirements:

1. The solution must be absolutely transparent and preferably of a brilliant red-orange or salmon-red color.

2. Five c. c. of the solution must be completely precipitated by 1.7 c. c. of a 1 per cent solution of sodium chloride in the time interval of one hour.

3. The solution must be neutral in reaction.

4. It must give a typical reaction with a known paretic cerebrospinal fluid.

5. It must produce no reaction greater than a No. 1 with known normal cerebrospinal fluid.

If a solution results that is unsatisfactory in any of these particulars, it should be discarded and, after a careful and thorough recleaning of all glassware, another solution made up. This procedure in our experience has always resulted in a satisfactory solution and takes less time and is less trouble than trying to "correct" a poor solution. Some specimens of gold chloride fail to give satisfactory solutions.

Note: The most important step in the preparation of the colloidal gold solution is obtaining a satisfactory formaldehyde solution.

A 0.5 per cent solution of formaldehyde made by simply diluting formalin to the desired strength is unsatisfactory, as the commercial product contains a large quantity of methyl alcohol and other impurities. In order to obtain a pure 0.5 per cent formaldehyde solution, commercial formalin must be distilled, the distillate assayed to determine its concentration, and then properly diluted.

Procedure for preparing 0.5 per cent solution of formaldehyde.—Place 250 c. c. of formalin in a 500 c. c. distilling flask, distill and reject the first third of the total, collecting the second third, and allow the last third to remain undistilled. The portion saved will be free from methyl alcohol and other impurities; this is now assayed for strength and properly diluted to 0.5 per cent.

The most satisfactory method of assay is one based on the method laid down in the United States Pharmacopœia. To 2 c. c. of the distillate placed in a 150-c. c. Erlenmeyer flask add 10 c. c. triple-distilled water and follow this with exactly 50 c. c. of normal volumetric solution of potassium hydroxide. Place on a bath of boiling water and heat; now slowly add 50 c. c. of United States Pharmacopœia solution of hydrogen dioxide which has been neutralized to litmus. Heat cautiously, shaking occasionally for about 10 or 15 minutes. Remove and cool, add 5 c. c. of litmus indicator and titrate with normal volumetric sulphuric acid solution. The amount of N/1 H_2SO_4 required, subtracted from 50, and the result multiplied by .03002 gives the weight of formaldehyde in the 2 c. c. taken for assay; this quantity multiplied by 50 gives the per cent strength of the redistilled formaldehyde solution. To calculate the amount of the strong formaldehyde solution required for making 100 c. c. of 0.5 per cent strength, divide 50 by the per cent strength.

Water.—All water used in the preparation of the stock solutions and the reagent itself must be triple distilled. A block tin condenser is used, and rubber connections must be avoided. A very satisfactory

ondenser can be made from a piece of block-tin tubing about 60 cm. ong, bent in the form of an inverted "U." with one long arm and one hort arm. The short arm is passed through a tin-foil covered cork nto the distilling flask and the long arm is surrounded by a glass or netal cooling jacket through which water circulates. The lower end f the tube passes into a flask placed to catch the distillate.

To the first distillate is added a small quantity of sodium carbonate about 1 gm. per liter). We believe this to be very important, as t frees the water from all traces of ammonia that may be present lue to absorption of the gases in the laboratory, and as a further precaution against impurities. The first 10 per cent of the second listillate is discarded, 80 per cent is collected, and the last 10 per cent llowed to remain in the flask. The collected second distillate is edistilled, discarding the first 10 per cent and collecting about 80 per cent, which is the third distillate or the triple-distilled water to e used in preparing the colloidal gold solution and for washing all glassware.

Glassware.—New glassware should be used, and should not be used for any other purpose. It is first cleaned with hot soapy water and hen rinsed with aqua regia. After this, all flasks, pipettes, etc., are completely filled with tap water many times to drive out all traces and fumes of aqua regia, and then rinsed with distilled water, and ust before use with triple-distilled water.

PROGRESS IN MEDICAL SCIENCES.

REVIEWERS.

Lieutenant Commander C. W. O. Bunker, Medical Corps, United States Navy.
Lieutenant Commander W. M. Kerr, Medical Corps, United States Navy.
Lieutenant Commander J. J. O'Malley, Medical Corps, United States Navy.
Lieutenant John Harper, Medical Corps, United States Navy.
Lieutenant L. H. Clerf, Medical Corps, United States Navy.
Lieutenant L. W. Shaffer, Medical Corps, United States Navy.
Lieutenant E. Peterson, Medical Corps, United States Navy.

GENERAL MEDICINE.

PIERSOL, G. M. **Factors of prognostic significance in persistent high blood pressure.** Med. Clinics of North America. November, 1921.

A discussion of prognosis in disease is distinctly of practical value, because there is no phase of medicine of equal importance that is so difficult to master and yet is so generally neglected. This is especially true in connection with patients who have a persistently high blood pressure, because questions invariably arise as what will be their ultimate fate and what effect will high pressure have upon the duration of life.

To formulate an intelligent opinion about the prognosis of any disease it is essential to observe a number of cases, and also to have such cases under observation for a considerable period of time. A group of 160 cases have been studied, who have exhibited a blood pressure of 170 millimeters of mercury or over, and they have been under observation from 2 to 10 years.

Vascular hypertension can not be regarded as a disease, but must be looked upon as a symptom of some underlying cause. The conditions capable of producing high blood pressure are varied, and it is necessary, first of all, to study this group of cases from the standpoint of the etiology of their increased vascular tension. In some cases it was very difficult to determine the exact etiological factor, because when vascular hypertension has existed for any length of time secondary changes invariably take place in the heart, kidneys, and blood vessels.

From a study of the records of these cases it is apparent that they can be divided into three main groups: (1) Those in whom the high blood pressure is the result of some type of chronic nephritis; (2) those in whom a high systolic pressure is incident to a primary cardiac condition, such as aortic insufficiency; (3) those in whom vas-

cular changes are primarily responsible for the elevation in pressure. The last group is susceptible of further etiological subdivision. The majority of this group may be looked upon as an expression of some phase of arterial sclerosis—toxemias, or chronic infections, furnishing the basis for the arteriosclerotic changes. A large proportion of them fall under the head of primary, essential, or idiopathic hypertension—the hyperpiesis of Sir Clifford Allbutt. In others the rise in blood pressure has been coincident with the menopause and represents a type of hyperpiesis that has been termed "climacteric hypertension." A small group is apparently due to some endocrine disturbance. In some of these there was evidence of hyperthyroidism, and in a few the clinical phenomena suggested the existence of some aberrant function of the pituitary, and possibly the adrenals.

In this group of 160 cases the persistent high pressure has been regarded as due to some form of chronic nephritis in 81, to primary vascular cause in 74, and to be the result of aortic regurgitation in 5.

Such relationship as sex and the diagnoses bear to each other may be seen in the following table:

Males:		
Chronic nephritis		45
Hyperpiesis and arteriosclerotic	22	
Climacteric hypertension	0	
Endocrine disturbance	4	
		26
Aortic insufficiency		2
Total		73
Females:		
Chronic nephritis		36
Hyperpiesis and arteriosclerotic	30	
Climacteric hypertension	16	
Endocrine disturbance	2	
		48
Aortic insufficiency		3
Total		87

Up to the present time 60 of this series have died, and of this 60 45, or 75 per cent, suffered from some type of chronic nephritis, 13, or 21.7 per cent, were arteriosclerotics, 1 was an endocrine case, and 1 had aortic insufficiency.

Of the 100 cases which are still alive 36 are chronic nephritics, 39 are instances of arteriosclerotics, 16 come under the head of menopausal hypertension, 4 are cases of aortic insufficiency, and 5 suffer from some endocrine disturbance.

These figures show the important bearing that etiology has upon the prognosis, as the greatest mortality existed among the chronic nephritics, of whom 55.5 per cent terminated fatally and about 28

per cent died within three years. Only 17.6 per cent of the arteriosclerotics are dead, and no case of menopausal hypertension has thus far succumbed. The favorable prognosis in the latter group of cases is a practical point worthy of emphasis.

An inquiry into the exact cause of death in the 60 cases shows that 17, or 28.3 per cent, succumbed to chronic cardiac dilatation, 14, or 23.3 per cent, died of cerebral hemorrhage, 11, or 18.3 per cent, died of uremia, and in 6, or 10 per cent, angina pectoris proved the terminal event. Pneumonia and carcinoma were each responsible for 4 deaths—3 succumbed to diabetes and 1 to acute pericarditis. Chronic cardiac failure and cerebral hemorrhage proved the commonest cause of death in this group of cases.

A study of the ages at which death occurred is of some prognostic interest. Of the six cases which were observed between the ages of 25 to 40, 66.6 per cent are dead. The next largest number of cases occurred between the ages of 40 to 60; of these 25 per cent have succumbed. The largest group fell between the ages of 60 to 80, of which 41.3 per cent have terminated fatally. Of the small group that was observed after the age of 80, 75 per cent are dead. The mortality was high among the young individuals of the series because of the rapidly progressing types of nephritis, from which most of them suffered. The greatest mortality occurred among the aged, because terminal infections were common, and in them degenerative visceral changes were far advanced. After the age of 40 the percentage of deaths increased with each decade of life.

Efforts to draw prognostic conclusions from the height of blood pressure alone proved uncertain and unreliable. Of the 29 cases that exhibited a systolic blood pressure of 220 or over, 11 died within 3 years, 1 lived for 5 years, and 1 for 6 years. On the other hand, of the 16 that are still alive, all have lived at least 2 years, and 11 have lived from 5 to 12 years since coming under observation. In short, more patients of this series are alive to-day with systolic blood pressure of 220 or over than have succumbed. No more helpful results are obtained when the diastolic pressure is taken as a prognostic index. The height of the blood pressure per se, whether the systolic or diastolic is considered, bears little or no relation to prognosis; the important prognostic factor is the underlying cause of the hypertension.

From this study of 160 cases of chronic vascular hypertension, due to various causes, certain conclusions can be drawn that have a bearing upon prognosis:

1. Chronic renal disease is chiefly responsible for hypertension in men, whereas in women hypertension is more often the result of some primary vascular disturbance. The frequent occurrence of climacteric hypertension largely accounts for this difference.

2. In cases of persistent hypertension the etiology of the high blood pressure bears a definite relationship to the prognosis. The mortality is greatest in those cases of hypertension that are due to chronic nephritis. Menopausal hypertension is conspicuously benign.

3. About 28 per cent of the chronic nephritics that exhibit marked high blood pressure succumb within three years of the time they come under observation.

4. The chief causes of death in cases of high blood pressure are cardiac failure and cerebral hemorrhage.

5. After the age of 40 the percentage of mortality in patients with hypertension increases with each decade.

6. The height of the blood pressure per se, whether the systolic or the diastolic pressure is considered, bears no definite relationship to prognosis. The most important factor in determining the prognosis is the underlying cause of the high blood pressure. (J. J. O'M.)

KOLMER, J. A. **Studies in the standardization of the Wasserman reaction. A new complement fixation test for syphilis based upon the results of studies in the standardization of technic.** Am. Jour. Syph. January, 1922.

The technic described represents the results of nearly six years of continuous investigation upon the subject of standardization of technic. The requirements fulfilled by the new technic are: (1) As high degree of sensitiveness as is permissible with specificity; (2) practical specificity; (3) technical accuracy and uniformity in results; (4) yield a quantitative reaction; (5) simplicity in technic; and (6) economy.

The requirement of sensitiveness is met by use of (1) a highly sensitive antigen; (2) the use of a large amount of antigen; (3) using relatively large amounts of serum and spinal fluid; (4) heating sera (except spinal fluid) for only 15 minutes at 55° C.; (5) using a mixture of guinea-pig complement; (6) mixing serum and antigen for brief period before addition of complement; (7) primary incubation of 15 to 18 hours in a refrigerator at 6° to 8° C.; (8) close adjustment of the hemolytic system in order to avoid excessive amounts of complement and hemolysin; (9) by using an antisheep or antiox hemolytic system; and (10) reading reactions within three hours after the conclusion of the secondary incubation.

Practical specificity is met by: (1) Close adjustment of the hemolytic system to a primary incubation of 15 to 18 hours at 6° to 8° C. in order to supply sufficient complement and hemolysin; (2) careful titration of antigen under conditions rendering the dose employed suitable for a primary incubation at 15 to 18 hours at 6° to 8° C.; (3) including serum, antigen, hemolytic, corpuscles, positive and negative controls.

Technical accuracy and uniformity in results is met by: (1) Adopting the principle that pipetting relatively large amounts of fluid tends to greater accuracy than measuring smaller amounts; (2) using a total volume of 3 c. c.; and (3) using a reading scale.

A quantitative reaction is obtained by using varying amounts of serum or spinal fluid with constant amounts of complement and antigen.

Concerning the requirements of economy, the author states that from the standpoint of time required the new test can not qualify as being economical; from the standpoint of materials it easily qualifies. In regard to simplicity he feels that any technic, especially one not involving new principles, is simple for an experienced worker in serology.

THE QUANTITATIVE COMPLEMENT FIXATION TEST FOR SYPHILIS.

Tube.	Patient's serum in 0.5 c. c.[1]	Antigen 10 units.		Complement (2 full units).		Hemolysin 2 units.	Corpuscles (2 per cent).	
		c. c.		c. c.		c. c.	c. c.	
1	0.1 c. c	0.5	Wait 5 to 30 minutes.	1.0	Primary incubation at 6 to 8 C. for 15 to 18 hours.	0.5	0.5	Secondary incubation 1 hour at 38 C. Read 1 to 3 hours later with scale.
2	0.2 c. c	0.5		1.0		0.5	0.5	
3	0.004 c. c	0.5		1.0		0.5	0.5	
4	0.002 c. c	0.5		1.0		0.5	0.5	
5	0.001 c. c	0.5		1.0		0.5	0.5	
6	0.1 c. c. (control)	0.5		1.0		0.5	0.5	
7	Antigen control	0.5		1.0		0.5	0.5	
8	Hemolytic control	0.5		1.0		0.5	0.5	
9	Corpuscle control	0.5		2.5 saline.		0.5	0.5	

[1] Spinal fluid doses: 0.5, 0.25, 0.125, 0.0625, 0.03125, and 0.5 c. c. (control). A qualitative test is obtained by using largest amounts of sera.

(J. H.)

SCHAMBERG, J. F. **Modern conceptions of the treatment of syphilis.** Penna. Med. Jour. January, 1922.

This paper deals with the principles and methods of treatment of primary, secondary, and tertiary cutaneous syphilis.

The purpose of treatment is to exterminate every spirochete in the body. The most powerful chemical weapon which we possess is arsphenamin. Mercury, which was for several centuries recognized as the sheet anchor of treatment, must still be regarded as a remedy of value, but occupies a position of secondary importance. Mercury is fifty times more toxic than arsphenamin. Mercury, in the highest dosage that can be tolerated by man in a single or several succeeding administrations, fails to affect a disappearance of spirochetes in external lesions. From the clinical standpoint the arsphenamins, unless used too intensively, have a tonic effect upon the general health, improving color, weight, and the general sense of well being. Theoretical and practical considerations demand that arsphenamin and mercury be used in the therapeutic attack on syphilis.

In the choice of arsphenamin to be employed the pendulum of medical opinion has swung toward a preference for neoarsphenamin. To what extent the change from "606" to "914" has been influenced by simplicity of preparation of the solution and facility of injection is difficult to say.

"606" has several important advantages over "914." It is a more uniform product. Owing to technical difficulties, different lots of neoarsphenamin from the same laboratory will exhibit variation. Neoarsphenamin is a less stable product than arsphenamin. It undergoes oxidation more rapidly, both in solution and in the dry state, and under certain condition may deteriorate after long aging. However, neoarsphenamin is better tolerated by the patient, is less liable than arsphenamin to give rise to seriously disturbing reactions which may interrupt the course of the patient's treatment, and above all is distinctly the safer drug. The mortality after neoarsphenamin is decidedly less than after arsphenamin. Neoarsphenamin is a blander product than arsphenamin and being neutral in reaction is better tolerated by the blood vessels and tissues of the body. The value of a parasiticide is to be judged by a joint consideration of its therapeutic properties and its toxicity. The real test is the therapeutic index, which is represented by the relation of the maximum tolerated dose in animals to the sterilizing or curative dose. The studies of Schamberg, Kolmer, and Raiziss would indicate a higher therapeutic index for "914" than for "606." Sodium arsphenamin appears to be inferior to "606" and "914."

With reference to silver-arsphenamin a sufficient period of time has not yet elapsed to enable one to express a definite opinion concerning its merits. This is likewise true of arsphenamin-sulfoxylate and sulfarsenol.

It is possible to cure virtually all cases of primary seronegative syphilis by the use of arsphenamins alone. A high percentage of cases of secondary syphilis can be cured by weekly injections of arsphenamin or neoarsphenamin alone, although some cases run on with a persistent positive Wassermann reaction. Ten injections of arsphenamin appear, in general, to be equivalent to about 15 injections of neoarsphenamin. The majority of patients will tolerate two doses of 0.9 neoarsphenamin for 2 weeks and then once a week for 8 to 10 weeks or longer.

As to the advantages and disadvantages of a straight arsenical régime, Schamberg thinks there is a decreased liability to exfoliative dermatitis and to jaundice and other liver complications. Combined arsenical and mercurial treatment is more therapeutically active and more rapidly curative than the sole use of either drug, but unless certain safeguards are followed an increased risk attaches to such treatment. Intramuscular injections of insoluble mercury should

not be given during the regular arsenical treatment, for accumulation of mercury in the gluteal deposits invariably takes place. The safest efficient method of employing mercury with arsphenamin is by inunction, and even here the rubbings should not be too intensive. With the joint treatment one can afford to use both the arsenical compound and mercury in more moderate dosage than when they are employed alone. There is no objection to giving small doses of mercury by mouth in conjunction with neoarsphenamin.

Treatment of exposed individuals.—Cases occasionally arise in which it appears to be thoroughly justifiable to give systematic prophylactic treatment to an individual who is known to have had relations with a person suffering from syphilis. Under such circumstances, while one can not be convinced in an individual case that spirochetic implantation has taken place, experience has proved that a prompt therapeutic attack can prevent generalization of the infection. In an individual seen within 24 to 72 hours after exposure to a known active syphilitic, two intravenous injections of neoarsphenamin in 0.6 to 0.9 gram doses should suffice to abort the infection. If a considerably longer time has elapsed, it is perhaps wiser to await the finding of the spirochetes in the initial sore before instituting treatment.

It should be remembered that at the time of the first appearance of a chancre, the Wassermann is always negative, and that within 10 days after its appearance only 30 per cent of the cases will exhibit a positive Wassermann reaction. After 40 days practically all cases will give a positive reaction. In an untreated and uninfected chancre, spirochetes may be found in virtually 100 per cent of cases.

Primary syphilis.—Schamberg advises the employment of two injections of neoarsphenamin 0.9 gram, or arsphenamin 0.3 gram, twice a week for two weeks, then once a week for six weeks. At the same time inunctions of 50 per cent mercurial ointment on alternative days, with a continuance of the rubbings until 30 have been used. After a rest of three weeks the entire course should be repeated. Another rest of three weeks should then be given, and, if the Wassermann is negative and no evidence of syphilis exists, mercury by mouth as an added security should be taken three weeks out of four for a year. There is no objection to employment of three or four courses of mercurial injections or inunctions instead of the treatment by mouth. Oral treatment, however, is not held in such contempt as many are disposed to regard it.

Secondary syphilis.—The treatment of secondary syphilis differs from that of primary syphilis only in the sense that more treatment is necessary in view of the fact that the spirochetes have been profusely deposited in all of the organs and tissues of the body. To in-

sure complete extermination, three courses of the arsenical and mercurial treatment above referred to should be given during the first year and two during the second. In the intervals mercury may be taken by mouth.

There has been too much tendency to regard a negative Wassermann as evidence of extinction of the infection. All biological tests are fallible, and the great weakness of the Wassermann reaction is the negative outcome. Not infrequently the Wassermann is negative in the presence of a circumscribed tertiary cutaneous lesion or in certain cases of visceral syphilis. Every patient must receive an irreducible minimum of treatment; otherwise his future is uncertain.

Tertiary syphilis.—The treatment of tertiary syphilis is based on rather different principles than that of lues in the earlier stages. Intensive treatment is ordinarily to be avoided, for rapid cure is unlikely and the administration of the powerful remedies may do actual harm. Many of these patients have changes in the cardiovascular apparatus and pathological alterations in various organs, which makes them more vulnerable to the insults of treatment.

Moderate doses of neoarsphenamin may be given and followed by small doses of mercury. The iodides, while not directly spirochetocidal, have an admirable influence in this stage. It is true of syphilis generally, but with special application to the tertiary luetic, that the patient must be treated as well as the disease. Patients over 50 years of age who have no evidence of active visceral or neurospyhilis should not be vigorously treated even though they have a strongly positive Wassermann reaction. At all times during the course of treatment careful attention should be paid to danger signals, such as renal irritation, jaundice, itching, or cutaneous eruption.

He concludes that no crystallized formula of treatment can be adopted to all cases; in no disease is individualization more essential. (L. W. S.)

Solomon, H. C. **The treatment of neurosyphilis.** Penna. Med. Jour. January, 1922.

Dr. Solomon's article is very interesting, instructive, and exceptional, especially in the intensity of the treatment advocated. However, in the treatment of cases of neurosyphilis as outlined the seriousness of the condition warrants the intensive treatment employed, and especially so in the light of the results secured. Those interested in the treatment of neurosyphilis should read the article in detail. He summarizes his paper with the following points:

1. Neurosyphilis frequently develops during the course of the usual routine antisyphilitic treatment, which must then be considered inefficient.

2. More intensive general treatment may be quite efficient in such cases.

3. There are cases which do not seem to respond to general treatment given in amounts approaching the patient's tolerance.

4. Some of these cases will react very favorably when given intraspinous treatment.

5. Again, there are cases which do badly under a combination of general and intraspinous treatment.

6. Some of these cases will do well when given intraventricular injections.

7. It does not follow that any one method is supreme for all cases, but merely the best for a given case.

8. Thus, mercury and iodides may succeed when arsphenamin fails.

9. There are cases (notably general paresis) where the combination of our present methods is not efficient.

10. The spinal fluid is not the major criterion of success or failure, as patients whose fluids remain pathological may recover clinically, whereas patients whose fluids become negative may succumb from neurosyphilis.

11. Treatment as ordinarily given is far below the patient's tolerance; the frequency with which intravenous arsphenamin and intraspinous injections may be safely given is rarely reached. (L. W. S.)

McCrae, T. **The treatment of visceral syphilis.** Penna. Med. Jour. January, 1922.

There are two factors to be considered in the treatment of visceral syphilis; a chronic spirochetal infection, and the tissue changes it produces. The ideal treatment aims to correct both conditions. In the treatment of visceral syphilis we hope to kill the infection, but it is wiser to regard it as being latent and not absent. This is especially true in syphilitic infection of the aorta. In the liver, however, a syphilitic process shows little tendency to recur. As to the tissue changes, much depends upon the extent and duration of the process when treatment is begun, but the majority of cases may be materially aided and a satisfactory functional result secured. The iodides are of great value in combating tissue changes. It should be remembered that syphilis is particularly a vascular disease and that specific treatment has little or no influence on vascular changes.

In cases of visceral syphilis a negative Wassermann in the presence of clinical signs, or even a justified suspicion should have no influence whatever as a preliminary to treatment. An infected individual should be treated for the rest of his life at intervals, no matter how well he may seem to be and regardless of his serum reaction.

In visceral syphilis the dose of arsenicals should always be small to begin with and increased gradually if at all. If the aorta is involved in these cases there is a definite danger from the use of arsenicals. In syphilis of the liver the use of arsenicals is contra-indicated. The use of mercury demands a thorough study of the kidneys before its use is begun.

Treatment should be started with 0.2 gram arsphenamin or equivalent of neoarsphenamin (except in hepatic syphilis), repeated weekly for five to six weeks, and mercury given later. A course of 20 to 30 inunctions should be given, 6 a week. A rest interval of two weeks is allowed and then the above course is repeated, followed by a rest period of three months, during which time mercury is given by mouth. Administration of iodide is begun at once and continued steadily during the above course in small doses and after this at least one month in three. The treatment should be repeated perhaps twice a year or at least once a year for the remainder of the patient's life. The blood should be watched and proper treatment carried out for anemia. (L. W. S.)

NOGUCHI, H. **A new technique for staining treponema pallida.** Jour. Am. Med. Assn. December 24, 1921.

A procedure promising to be of practical value in the routine diagnosis of syphilis, when the dark field is not available, because of its simplicity. A buffer solution containing formaldehyde (1 part of formaldehyde solution in 9 parts of phosphate buffer solution which consists of 88 parts of M/15 Na_2HPO_4 plus 12 parts of M/15 KH_2PO_4 ph 7.6), is used as fixative, the scraping or tissue emulsion being suspended in a small amount of the buffered formaldehyde solution and mixture allowed to stand for at least five minutes (the longer the fixation the better the results; the organisms remain well preserved for at least two or three weeks). Thin films are made on clean slides, dried in the air, the film surface is flooded with a saturated alcoholic solution of gentian violet or fuchsin, or with Stirling's solution of gentian violet such as is used for Gram's stain. And the slide is almost immediately washed in running water and air dried. (J. H.)

WARTHIN, A. S., and STARRY, A. C. **Second improved method for the demonstration of spirocheta pallida in the tissues—Warthin and Starry's silver-agar cover-glass method.** Jour. Am. Med. Assn. January 22, 1921.

This is a simple short method for the demonstration of the treponema in tissues; the entire procedure requiring less than one hour after sections have been mounted on cover glasses.

Method.—Tissues fixed in neutral formaldehyde. Embed in paraffin. Cut and mount sections on cover glasses with albumin fixative. Remove paraffin (xylene, alcohol, water). Rinse cover glass with section in 2 per cent silver nitrate; cover wet section with another perfectly clean cover glass, so that they are held together by capillary attraction; then place them carefully in a bottle of 2 per cent silver nitrate and place in incubator for from 30 minutes to 1 hour, then remove from the silver nitrate and separate cover glasses. Place cover glass with section in this reducing mixture:

2 per cent silver nitrate solution	3 c. c.
Warm glycerin	5 c. c.
Warm 10 per cent aqueous gelatin solution	5 c. c.
Warm 1.5 per cent agar suspension	5 c. c.
5 per cent aqueous hydroquinone solution	2 c. c.

After the section is reduced, remove and rinse in 5 per cent sodium thiosulphate (hyposulphite) solution. Rinse in distilled water, absolute alcohol, xylene, mount in balsam. (J. H.)

SURGERY.

PEPPER, O. H. P. **Postoperative pulmonary complications with two illustrative cases.** Med. Clinics of North America. November, 1921.

Statistics have been published which seem to show that irrespective of the operation performed or the anæsthetic employed, 1 patient in every 50 operated upon will develop some postoperative complication, and, furthermore, 1 patient in every 150 or 175 operated upon dies as a result of postoperative pulmonary complication. Even if these statistics, as is so often the case, exaggerate the point in question, yet there can be no doubt that postoperative pulmonary complications are both amazingly frequent and severe.

The first case is a colored male, aged 33 years. Admitted with a complaint of "pain in the loin and bloody urine." Renal calculus was diagnosed and confirmed by roentgenogram. Left nephrolithotomy was performed under ether anæsthesia and two renal calculi removed. He made an uneventful recovery until the fifteenth postoperative day, when he was suddenly seized with severe sharp pain in the right side near the level of the umbilicus and radiating to the right chest and shoulder. His respirations were shallow and rapid, the pulse rate 96, and the temperature 99.6° F. The next morning the patient coughed up several "lumps of blood," and the signs of acute pleurisy were discovered at the right base; fever a little higher. Two days later the signs in the right base included impairment to percussion, diminished breath sounds, egophony, and pectoriloquy. Exploratory puncture was performed with negative result. From this date on the evidence of pulmonary trouble grew

less and less clear and convalescence proceeded rapidly. Two weeks afterward a fluoroscopic examination revealed nothing but an adherent right diaphragm, probably residual from the recent attack.

This case is a typical instance of so-called "postoperative pulmonary infarction" or mild embolism. The signs which led to the unnecessary puncture of the pleura were probably the result either of fixation of the diaphragm by the pleurisy with some deflation of the lung, or a pneumonitis around the sight of the infarction.

The second case is a white female, aged 38 years. She had been in perfect health until three weeks before admission when she had 19 teeth extracted under nitrous-oxide anæsthesia. On recovering consciousness she vomited and coughed up considerable blood. She had no other symptoms until the tenth postoperative day when she developed a "catchy pain" near the tip of her left scapula and later commenced to cough and expectorate bloody purulent material. The sputa had a very offensive odor.

On admission to the hospital three weeks after the operation she was found to have abnormal physical signs at the base of the left lung; prolongation of breath sounds, and many râles heard at the end of deep inspiration. The sputa was purulent and contained no tubercle bacilli. There was fever up to 102° F. and a leucocytosis of 19,600, with 92 per cent of polymorphonuclear cells. The roentgenographic findings were confusing, but a diagnosis of "lung abscess" was made.

With rest in bed, and the use of autogenous vaccine made from the sputa cultures, the patient rapidly improved and was discharged free of fever and with practically no cough or expectoration. Three months after being discharged she returned to the hospital with a severe "cutting pain" in the left side, fever, and hæmoptysis. All the signs of empyema were found at the base of the left lung and by needle puncture a thick, greenish, blood-tinged pus was obtained. The fever was high and leucocyte count 23,500. A resection of the seventh and eighth ribs was performed and a large amount of bloody purulent material was evacuated from what appeared to be a localized empyema, possibly of interlobar origin.

Once an abscess is formed in such cases the condition is serious and at best is of long duration. This patient showed rapid improvement following the preliminary infection, but the later happenings confirmed the accepted view that pulmonary abscess is slow to heal and often leads to serious danger. With improvement in the technique of pulmonary surgery, operation is more and more becoming the accepted treatment for abscess of the lungs, unless medical treatment is promptly successful. (J. J. O'M.)

TROPICAL MEDICINE.

CORT, W. W., AUGUSTINE, D. L., AND PAYNE, G. C. **Investigation on the activities of infective hookworm larvæ in the soil. Preliminary report.** Jour. Am. Med. Assn. December 24, 1921.

The results of investigation by these workers are so at variance with present ideas that we are forced to revise our whole conception of the life of the infective hookworm larvæ under natural conditions. They find that, contrary to our present views, it is a common occurrence for mature hookworm larvæ to lose their sheaths while living in the soil and to continue their lives in the unsheathed condition. For example, it was found that out of a total of 4,279 mature hookworm larvæ isolated from a series of 105 soil samples, taken from an area of a sugar-cane field heavily polluted by individuals infested with hookworms, only 1,808 were inclosed within the protective sheath, while 2,471 had lost their sheaths.

In regard to the migrations of infective hookworm larvæ in the soil, it was found that instead of actively migrating the larvæ are definitely limited to the place of development, so far as their own activities are concerned. Twenty experiments, using several types of soil, showed not a single migration of more than 4 inches.

Experiments also showed that the life of the hookworm larvæ under natural conditions is shorter than generally believed, there being a rapid reduction in numbers in the first three weeks, in some cases reaching 90 per cent, and almost completely dying out in about six weeks. (J. H.)

HALL, M. C. **The use of carbon tetrachlorid for the removal of hookworms.** Jour. Am. Med. Assn. November 19, 1921.

Carbon tetrachlorid in a dose of 3 c. c. administered in hard gelatin capsules is recommended for the removal of hookworms and ascarids. The drug is cheaper, more effective, and when chemically pure safer than thymol and chenopodium. It does not depress unstriated musculature or lessen peristalsis, thus eliminating the purgative which is an item of expense in extensive hookworm campaigns. The drug is of no value in treatment of tapeworms and is as unreliable as other anthelmintics for the removal of whipworms. (J. H.)

SCHWARTZ, B. **Hemotoxins from parasitic worms.** Jour. of Agricultural Research. November 19, 1921.

Experiments with extracts of Ascaris lumbricoides and other parasitic worms show that parasites secrete toxic products of etiological importance in parasitic diseases. Ascaris lumbricoides has been shown to secrete a hemolysin and a substance that inhibits the coagulation of blood. The hemolysin is a thermostabile, nonspecific, alco-

hol-soluble substance which appears to be rather firmly bound to the cells of the parasite and presumably to the cells of the intestine in which it is elaborated. It is neutralized by normal blood serum. The secretion that inhibits coagulation apparently has but comparatively slight potency. (J. H.)

BASS, C. C. **Specific treatment of malaria.** New Orleans Med. and Surg. Jour. January, 1922.

Bass shows why long-continued administration of quinine is necessary in the treatment and cure of malaria. The exact action of quinine is not known, but soon after treatment has started the asexual parasites lose their ameboid movements and the pigment granules their motion. The parasites begin to diminish in number. If the concentration of quinine in the blood is sufficient, most, if not all, the tertian or quartan asexual parasites will disappear within 24 hours.

The amount of quinine necessary to relieve clinical symptoms differs in different individuals. But since individualization is nearly impossible, the adoption of a standard dose is necessary. Thirty grains a day for adults and a proportionate amount for children is about the smallest amount that can be depended on to give the desired result. Experience has shown that this dose will cause the disappearance of clinical symptoms practically in all cases within three to four days.

Bass is a firm believer in the oral administration of quinine as being as effective as any other method. The drug may be given intravenously in cases of great urgency where there is good reason to believe the security of the life of the patient depends upon getting quinine into the blood stream at once. The dose should never be over 10 grains of the bihydrochloride. He condemns hypodermic or intramuscular administration of the drug in malaria.

After symptoms have abated, a very important phase of the treatment is left, namely, the curing of the infection. Quinine kills only the parasites in the circulating blood at the time and does not kill those lodged in the tissues. The most certain way to destroy the infection is to keep a sufficient amount of quinine in the blood stream at all times to kill any parasites that appear in the blood.

Experience has shown that 10 grains a day for a period of about eight weeks will cause the disappearance of the infection in almost all cases. (E. P.)

SCHÜFFNER, W., and HYLKEMA, B. **A malaria epidemic in Naras in 1918.** Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie. Deel 1. 1921.

Naras is a village of about 3,600 inhabitants, situated on the west coast of Sumatra. In August, 1918, a severe epidemic of malaria

broke out, with a very high death rate. Practically half of the children under 3 years of age died during the epidemic.

Annual mortality rate per 1,000 in 1918:

April	3	July	150	October	205
May	10	August	307	November	213
June	12	September	272	December	235

The characteristics of the epidemic may be summarized as follows:

Children as well as adults were severely infected.

The infective index was very much higher than the splenic index, even in adults.

The spleens were only moderately enlarged.

There were many parasite carriers without splenic enlargement.

Among pernicious cases there were many gamete carriers.

Sixty-five per cent of the population were plasmodia carriers.

Fifty-seven per cent were infected with the subtertian, 28 per cent with the tertian, and 2.8 per cent with the quartan type.

Of eight species of anophelines collected, only *M. ludlowi* was found to be infected in nature. In the beginning of the epidemic 3 per cent of these mosquitoes were infected.

As seen from the mortality table, the high death rate kept up to the end of the year in spite of quinine administration, which was started in the latter part of August. The authors contribute the failure of quinine to reduce the death rate to the small doses they were by necessity forced to give.

The contrast between effective quininization as carried on among the school children and the method adopted for the population at large is shown by the December examination. Among 410 children not attending school, the splenic index was 84 and the infective index was 104, while among 150 school children the figures were 19 and 11, respectively. None of the latter died.

The school children were given daily doses of 0.4 gm. for each 30 kg. body weight. From this experience the authors conclude that children can take quinine for months in large doses without harm, and that a severe epidemic of pernicious malaria can be fought successfully with quinine, provided the people are under some kind of effective control. [E. P.]

MANSON-BAHR, P. H. **Dysentery: A review of the literature of the last six years.** Trop. Dis. Bul. December 15, 1921.

During the war and the period immediately following the cosmopolitan nature of amœbiasis was noted. It was found to be no longer a disease peculiar to the Tropics but of rather widespread geographical distribution. Cases were reported from England, Holland, France, Germany, Italy, Spain, and Australia. Dogs, cats, and monkeys were found to be susceptible to the disease.

With regard to the etiology of amœbic infection, probably the most exhaustive studies made during the past four years are those of Dobell (Amœbæ living in man, 1919), who shows how the nuclear characteristics of *E. histolytica*, a uniform layer of small chromatin granules at the periphery, the central karyosome with its halo and the absence of chromatin in the intravening space, serve to distinguish it from all other intestinal species of the genus *Entamœba.*

The cysts of *E. histolytica* survive for several weeks outside the body if kept moist and cool. Some remain alive much longer than others, and as they die they become permeable to aqueous stains, such as eosin. Dobell considers that *E. histolytica* may sometimes form supernucleate cysts of eight nuclei, an occurrence, however, that happens very rarely.

Cultivation of the organism on artificial media has not been unquestionably successful. Cutler claims to have obtained cultures of pathogenic amœbæ in egg broth and a blood clot medium on 6 occasions out of 45 attempts. This work has not been confirmed by other workers.

Four other species of intestinal amœbæ are now recognized as parasitic in the alimentary tract of man, *Entamœba coli*, *Endolimax nana*, *Iodamœba bütschlii and Dientamœba fragilis.*

"Entamœba coli is a harmless commensal living in and feeding upon the contents of the large intestine, but never invading the tissues of its host. It is a large species, though subject to great variation in size. Its mean diameter is from 20 to 23 microns, the extremes from 18 to 40 microns. There is no marked differentiation of the protoplasm as in *E. histolytica*, and the granular cytoplasm generally contains food vacuoles and ingested bacteria, but never red blood corpuscles or other tissue elements. The cysts exhibit considerable variation in size (between 10 and 30 microns), and it is generally agreed that *E. coli* is a composite species consisting of a number of races. The immature cyst is uninucleate, the fully mature cyst octonucleate. Chromatoid bodies, though present in young cysts, usually disappear when they are fully mature.

"*Endolimax nana* is a small nonpathogenic amœba 6 to 12 microns in diameter, possessing a characteristic vesicular nucleus and a large, irregular, eccentric karyosome. It probably inhabits the small intestine and lives upon its contents. The cysts are oval bodies having characteristic features and are about the same size as are the active forms. When mature they contain four nuclei and a few refractile granules, no chromatoid bodies, and a considerable amount of glycogen.

"*Iodamœba bütschlii* is a small amœba intermediate in size between the two former species and measuring 9 to 20 microns in diameter.

The cytoplasm contains food vacuoles, bacteria, and other food particles. The nucleus is vesicular, with a moderate-sized central karyosome. This amœba feeds mostly upon the microorganisms of the large intestine. The cysts are uninucleated structures, frequently irregular in shape, and measure 9 to 12 microns in diameter. They are conspicuous mainly because they contain a large, dense glycogen mass, which stains intensely with iodine. The nucleus of the cyst is eccentrically placed and contains a conspicuous compact karyosome.

"*Dientamœba fragilis* is a very small and rare amœba of the large intestine. Its usual diameter is about 9 microns. Binucleate individuals are frequently encountered. The nucleus is large, spherical, and vesicular, the karyosome being large and composed of numerous granules. The organism lives exclusively upon bacteria; no cysts have as yet been found."

Dobell suggests that E. histolytica gains entrance into the tissues by secreting a powerful cytolytic ferment which dissolves them, so that these organisms come to lie in pools of broken-down tissue which they absorb as nutriment.

Manson-Bahr considers that amœbic ulcers may be differentiated by their gross characteristics from those caused by chronic bacillary infection by the following features: Amœbic ulcers commence usually in the solitary lymphoid follicles and run parallel to the long axis of the gut; they are discrete, oval in outline, flask-shaped on section, and involve the mucous membrane, the submucosa, and the muscular coats of the intestine. They are distributed throughout the large intestine from the cæcum to the rectum, being usually larger and more extensive in the lower part; the small intestine is never affected. The mucous membrane between the ulcers appears unaffected.

Chronic bacillary ulcers, on the other hand, appear to commence on the free folds of mucous membrane, and to be distributed transversely to the long axis of the gut; in outline they are serpiginous, with ragged, undermined edges, often intercommunicating with neighboring ulcers; they involve the mucous membrane as well as the muscular layer. They are found in the last 2 feet of the ileum, as well as in the large gut. The intervening mucous membrane is inflamed and presents an unhealthy plushlike appearance.

Dobell believes that probably not more than 10 per cent of the persons who become infected with E. histolytica ever suffer to any appreciable extent from their infections.

The signs and symptoms of liver abscess have been summarized by Talbot as follows:

"(1) General enlargement of the liver; (2) pyrexia, either continuous or remittent; (3) leucocytosis of 18,000; (4) a local tender spot over the liver; (5) signs of irritation at the base of the right

lung; (6) rapid wasting; (7) heavy nocturnal sweats. Symptoms of less value are local bulging, pallor, rigors, referred pain in the right shoulder, and rigidity of right rectus."

In the acute stages of the disease, Ledingham has pointed out that fully 90 per cent of untreated amœbic dysenteries may be correctly diagnosed by a single microscopical stool examination.

The diagnostic characters of the cellular exudate of the "amœbic stool" have been emphasized by Willmore and Shearman. These may be summed up as follows: Scantiness of the cells, especially polymorphonuclears, and preponderance of mononuclears over polymorphonuclears; evidence of proteolytic digestion of the cells; absence of all phenomena characteristic of inflammatory reaction.

The microscopic diagnosis in the chronic or latent stage of amœbiasis is by no means so easily made. Numerous specimens should be examined before this condition is excluded, especially in the so-called cyst carriers. Cropper and Row give the following method for the concentration of cysts. "Feces and saline in the proportion of 1 gm. of feces to 30 c. c. saline are shaken on a shaking machine for a minimum of half an hour. The emulsion is then poured into a separating funnel and shaken up by hand for half a minute with 10 to 20 per cent of its volume of ether and allowed to stand for a minute or two. The fecal matter absorbs the ether and rises to the top of the saline, while the cysts remain beneath; by this method a fifteenfold cyst concentration is effected."

The identification of cysts is best effected by iodine or hametoxylin staining.

Acton, and more recently Thomson and Robertson, consider the presence of Charcot-Leyden crystals in stools as quite suggestive if not diagnostic of amœbiasis. Manson-Bahr and Gregg advocate the routine use of the sigmoidoscope.

Growing disbelief in the efficacy of hypodermic injections of emetine hydrochloride to effect a radical cure of amœbic dysentery is manifest in all the more important recent literature. Wenyon and O'Connor, in Egypt, concluded that it was necessary to administer larger doses than had hitherto been considered judicious in order to effect a cure. They injected 1 grain a day hypodermically, together with the administration of one-half grain in keratin-coated tabloids by the mouth for 12 days, totaling 18 grains.

Emetine bismuthous iodide seems to be gaining favor in the treatment of this disease.

Efficient prophylaxis of amœbiasis depends upon an exact knowledge of the manner in which the infection is spread. Unfortunately, this can not be said to be satisfactorily settled. The carrier undoubtedly plays a big rôle in the spreading of this disease.

The prophylaxis of amœbiasis, as in the case of other familiar intestinal diseases, may be said to rest upon an efficient general sanitation. (E. P.)

MARCHOUX, E. **Une nouvelle maladie à bacilles acido-résistants qui n'est ni la tuberculose, ni la lèpre.** Bull. Acad. Med. March 8, 1921. (From Trop. Dis. Bull. December 15, 1921.)

The patient in question was a native of Haiti, aged 23 years. The diagnosis of leprosy had been made from the fact that in films from the nasal membranes and from the serous fluid of the vesicles (bullous eruptions being a symptom) colonies or masses of acid-fast bacilli were constantly found. The patient presented, however, certain peculiarities that did not agree with leprosy. There was an absence of zones of anæsthesia and no trace of nodules. The patient died from purulent pleurisy, and the author was able to ascertain for certain that he was dealing with an acid-fast organism differing from both the tubercle and the leprosy bacillus.

"In films from all the organs, but particularly from the spleen, could be found masses of bacteria arranged in spherical globi and surrounded by resistant gelatinous material, or held together in little drops of fatty substance. These masses consisted of very fine, short organisms, arranged anyhow, and offering in this a contrast to lepra bacilli, which are usually arranged in bundles of parallel germs. Stained with warm carbol-fuchsin they resisted decolorization by acids or alcohol, but were readily decolorized by xylene, toluene, acetone, ether, and chloroform. After decolorization by means of wax solvents the bacilli could no longer be stained with fuchsin, a character in itself sufficing to distinguish them from Koch's and Hansen's bacilli. The dimensions, shape, and arrangement in masses resembling little collections of red powder, and the way in which the individual elements disperse when the containing vacuole is ruptured, suffice to justify for the new germ the name proposed for it by its discoverer of *Mycobacterium pulviforme*. It is an organism of very small size, its dimensions being 0.5–1 micron in length by 0.25 micron in breadth. The 'masses' attain dimensions of from 2 to 20 microns. The masses could be found in the enlarged spleen, in the liver, where they were less numerous, and in the bronchial and mesenteric glands." (E. P.)

WALCH, E., AND WALCH-SORGDRAGER, B. **A malarial epidemic caused by M. Sinensis.** Mededeelingen van den Burgerlijken Geneeskundigan Dienst in Nederlandsch-Indië. Deel 1, 1921.

Sporadic cases of malaria had occurred at Sungei-Tuan for some time when an extensive epidemic broke out in October, 1919. The status of the population—contract coolies—made a more or less thorough investigation possible. The presence of the epidemic was revealed by the large number of patients admitted to the hospital, and its acute nature was shown by the examinations in December, 1919.

At this time the number of parasite carriers was high (50 per cent of the population) and partially equaled the number of enlarged spleens (splenic index 50). The number of gamete carriers was also high. A subsequent examination in May, 1920, revealed a considerable improvement, as shown by the marked reduction in enlarged spleens (index 12.5) and in parasite carriers. (Parasites were found in only 7 per cent of the population.) In the December examination 74 per cent of the parasite carriers were found to be of the subtertian type, and 25 per cent of the tertian. Toward the end of the epidemic the two types were practically equal in number. A few cases of the quartan type were seen. The epidemic was rather mild in nature, no deaths occurring during the entire period.

General quinine administration to all adults was begun in January, 1920. Children were included in this treatment in latter part of February. The dose for adults was 1.5 grammes daily for five days, then 1.5 grammes on two consecutive days of each week until middle of May.

The effect of the quinine is seen in the May examination, which shows a more marked reduction in the number of parasite carriers than of the splenic index. The difference between these two results is explained by the fact that quinine acts more quickly on simple parasite carriers, and that as the epidemic grew older the enlarged spleens increased relatively in number in comparison with the parasite carriers.

The children present a very interesting picture. The examination in February, 1920, showed that 27 per cent of them were parasite carriers, while the splenic index was 34.5. The subsequent examination in May gave 12 per cent carriers and a spleen index of 27. At the time of the February examination the epidemic had lasted for four months and only a few of the children had received quinine. The effect of the latter is shown, however, in the May examination.

In addition to quinine administration, routine antimosquito work was carried on. The following figures are of interest from an entomological standpoint. Capture of anophelines was kept up from De-

ember to May, inclusive, during which time the following mosquioes were dissected and examined:

Name.	Number examined.	Number infected.	Infective index (per cent).	Per cent of total infected mosquitoes.
[. ludlowi	58	10	17.5	7.5
[. barbirostris	9	.....	.....	.....
[. sinensis	7,263	107	1.5	84.0
. kochi	79	9	11.5	6.5
. aconita	43	1	.....	1.0
[. indefinita	1	.....	.....	.....
[. punctulata	1	1	.....	1.0

In the beginning of the epidemic *M. sinensis* was infected to nearly per cent, and on account of the large number present was considered as the chief offender. *M. sinensis* has never before been found nfected in nature to such an extent, and the opinion is prevalent that his mosquito does not carry subtertian fever. This epidemic shows, however, that at times this mosquito is a most successful vector. *M. ludlowi* carried both tertian and subtertian, while *Cellia kochi* was found to carry only the subtertian type. These determinations were made on the size and shape of the cyst pigment.

An interesting observation was made by the authors regarding the nfection of mosquitoes at different ages, the latter determined by he presence and size of the ova. The following table gives the findngs in the case of *M. sinensis:*

	Examined.	Infected.	Per cent.
1) No ova (young mosquitoes)	318	1	0.3
2) Small ova	773	9	1.2
3) Large ova	3,079	23	0.7
	4,170	33	

From this table it may be noted that a greater number of old than young mosquitoes were seen and that mosquitoes with no ova are nearly always free from infection. From the fact that group 2 has a larger infective index than group 3, the authors conclude that part of the infected mosquitoes have been overwhelmed by the infection and died.

The authors are at a loss in trying to explain the sudden flare-up of the epidemic. (E. P.)

Bettencourt, A., Barges, I., and de Scabra, A. **Vesical bilharziasis, indigenous to Portugal.** Comptes Rendus des séances de la Société de Biologie, t. LXXXV, No. 30, 1921, page 785. (From Office International D'Hygiene Publique. November, 1921.)

The authors report the presence of an indigenous focus of vesical bilharziasis (*Schistosoma hæmatobium*) in Portugal. Investigations are under way to determine the species of mollusk serving as intermediate host. (E. P.)

Mendelson, R. W. **An exceptional tropical ulceration.** Jour. Trop. Med. December 15, 1921.

Mendelson reports three cases of leg ulcers in Européan patients in Siam, in which the exciting cause proved to be a monilia. (E. P.)

PHYSIOLOGICAL CHEMISTRY.

Macht, D. I., and Gin-Ching Ting. **A study of antispasmodic drugs on the bronchus.** Jour. Pharmacol. and Exper. Therap., 1921, Vol. XVIII.

"The most powerful broncho-dilators determined by the above method were, firstly, papaverin and various benzyl compounds, which act on the muscle cells; secondly, atropin, which exerts its action through paralysis of the parasympathetic myoneural junctions; and, thirdly, epinephrin, which produces active stimulation of the true sympathetic dilator terminals."

"The action of various antispasmodic drugs on bronchial muscle varies" directly "in intensity to some extent with the previous tonicity or spasticity of the bronchus. A distinct difference in response to their reaction to drugs has been found to exist between the fresh surviving bronchi from healthy lungs, on the one hand, and lungs showing more or less pathological change, on the other hand," there being less effect upon the diseased. (C. W. O. B.)

Franceschi, G. **Methanol on trial.** Giorn. farm. chim., 1920, Vol. LXIX (Chem. Abst., 1921, Vol. XV).

In the numerous cases where death has resulted from drinking methyl alcohol, the latter was invariably the crude product. Crude wood alcohol may contain as low as 50 per cent methyl alcohol, the remainder being acetone and varying amounts of other impurities. Pure methyl alcohol is no more toxic than ethyl alcohol. The author has administered daily doses of 32 grams methyl alcohol for extended periods without causing the slightest indisposition. (C. W. O. B.)

GOTO, M., AND TAKAHATA, T. **Nature of beriberi and related diseases.** Fukuoka Ikwadaigaku Zasshi, 1918, Vol. XI, No. 4. Jap. Med. Literature, 1920, V. 20 (Chem. Abst., 1921, Vol. XV).

As a result of feeding experiments made on mice, rabbits, and hens the conclusion is drawn that beriberi is caused by cholic acid and its derivatives. (C. W. O. B.)

MACHT, D. I., BLOOM, W., AND GIN CHING TING. **Comparative studies of ethyl alcohol, caffeine, and nicotine on the behavior of rats in a maze.** Am. Jour. Physiol., 1921, Vol. LVI (Chem. Abst., 1921, Vol. XV).

The drugs were injected into white rats trained to enter a circular maze. In all dosages all three drugs were depressing rather than stimulating, nicotine having the greatest effect, caffeine next, and ethyl alcohol being the least depressing in effect. (C. W. O. B.)

MCMASTER, P. D., AND ROUS, P. **Biliary obstruction required to produce jaundice.** Jour. Exper. Med., 1921, Vol. XXXIII (Chem. Abst., 1921, Vol. XV).

The bile ducts from 75 per cent of the liver substance in dogs and monkeys can be obstructed without any clinical evidence developing of pigment or cholate accumulation in the organism. In the dog 95 per cent of the liver substance can be placed in stasis without the occurrence of tissue icterus such as regularly follows total obstruction in this animal. The plasma of the dog and monkey, unlike that of man, is normally free from bilirubin and this pigment so readily escapes from the blood into the urine that bilirubinuria is often to be found in the dog in the absence of bilirubinemia, while the latter is never met with alone in either animal. It follows that in both species the renal threshhold for bilirubin is much lower than in man, if, indeed, it can be said to exist at all. The amount of biliary obstruction required to produce jaundice in human beings is probably as great as in the experimental animals with which M. and R. have dealt. The clinical jaundice encountered in association with local liver lesions should be viewed not as the result of local bile resorption but as due to a general injury to the hepatic parenchyma or ducts or to blood destruction. (C. W. O. B.)

ASHBY, W. **Study of transfused blood. II. Blood destruction in pernicious anemia.** Jour. Exper. Med., 1921, Vol. XXXIV (Chem. Abst., 1921, Vol. XV).

Evidence is presented to show that there is no hemolytic toxin producing the anemia in pernicious anemia. The periods of active blood destruction which are seen as the exception in pernicious

anemia cases during a series of transfusions are due to the activity of the blood-destroying organs of the body rather than to the intrinsic weakness of the pernicious anemia blood corpuscle. It is questionable whether blood destruction is as important a factor in producing the anemia of pernicious anemia as it is at present usually assumed to be. (C. W. O. B.)

CAIUS, J. F., AND MHASKAR, K. S. **The correlation between the chemical composition of anthelmintics and their therapeutic values in connection with the hookworm inquiry in the Madras Presidency.** Indian Jour. Med. Research, 1920. Vol. VIII (Chem. Abst., 1921, Vol. XV).

Eucalyptol ranks low as an anthelmintic and can not be recommended for use in the eradication of the hookworm infection. Pure chloroform in combination with castor oil ranks high, and, in the usually prescribed doses of the eucalyptus-chloroform mixture, the eucalyptus is superfluous. (C. W. O. B.)

VOEGTLIN, C., AND SMITH, H. W. **Quantitative studies in chemotherapy. V. Intravenous versus intramuscular administration of arsphenamin. Curative power and minimum effective dose.** J. Pharmacol. and Exper. Therap., 1921, Vol. XVII (Chem. Abst., 1921, Vol. XV).

The intramuscular administration of arsphenamin and neoarsphenamin is just as efficaceous as the intravenous administration of these drugs in the treatment of experimental trypanosomiasis, as judged by the minimum effective dose and the percentage of survivals of treated animals. The significance of this point in the treatment of human syphilis is discussed. The ratio of the minimum lethal dose to the minimum effective dose is a substantial index to the curative power of a given drug under experimental conditions. (C. W. O. B.)

KRAFT, A., AND LEITCH, N. M. **Action of drugs in infection. I. Influence of morphine in experimental septicemia.** Jour. Pharmacol. and Exper. Therap., Vol. XVII, 1921 (Chem. Abst., 1921, Vol. XV).

Morphine sulfate in doses of 0.03 gram, which is about one-sixth to one-tenth the fatal dose, lowers the resistance of rabbits toward septicemia caused by the Strep. hemolyticus. It also lowers the temperature of the rabbit. In the administration of morphine at least two effects should be considered: The sedative action, and its influence on the course of the infection. The harmful influence is probably due to a number of factors, such as inhibition of phagocytosis, increase in intestinal stasis, with the increased production of toxins, and a general depression of the body temperature, of body metabolism, and of the body defense. (C. W. O. B.)

HORN, D. W. **Fumigation with formaldehyde—A substitute for the permanganate-formalin method.** Proc. Delaware County (Pa.) Inst. Sc., 1920, Vol. IX (Chem. Abst., 1921, Vol. XV).

The conclusion is drawn that at present the least expensive method for terminal fumigations is the bleaching powder-formalin method; for the same yield of formaldehyde gas this method costs approximately one-sixth as much as the standard potassium permanganate-formalin method and approximately one-third as much as the sodium dichromate-formalin method. In practice the bleaching powder is placed in a bucket and the formalin poured upon it. Five hundred c. c. of formalin with 250 grams of potassium permanganate is used per 1,000 cubic feet of space, and evolves 37.5 per cent of the total formaldehyde. With the bleaching powder-formalin method only 23 per cent is secured, so one employs (in order to secure the same concentration in the 1,000 cubic feet) 800 c. c. formalin and 620 grams of bleaching powder. (C. W. O. B.)

SHIPLEY, P. G., MCCOLLUM, E. V., and SIMMONDS, N. **Studies on experimental rickets. IX. Lesions in the bones of rats suffering from uncomplicated beriberi.** Jour. Biol. Chem., 1921, Vol. XLIX.

Uncomplicated beriberi or polyneuritis was produced in rats by a diet deficient in water-soluble B, and they developed "lesions in the bones which are essentially identical with those seen in guinea pigs suffering from acute and uncomplicated scurvy" (resulting from lack of antiscorbutic substance in diet). "Rats confined to the same diet supplemented with water-soluble B do not show these changes. The bones of rats on a diet which is only deficient in the fat-soluble A are osteoporotic but have no other resemblance to the bones of scorbutic animals." (C. W. O. B.)

EYE, EAR, NOSE, AND THROAT.

RANKEN, D. **The nose, throat, and ear requirements of airmen. Problems presented by the international medical requirements for air navigation, with special reference to the nose, throat, and ear.** The Lancet. December 17, 1921.

That the airman should be medically fit is a dictum that none can deny. Anyone subject to rapid changes of atmospheric pressure and with such physical responsibilities as are demanded of a pilot should be organically sound, especially in regard to the nose, throat, and ear. For this reason all aviation medical boards have laid down standards which in the early days were most arbitrary but which became modified from time to time as knowledge was acquired of the physiological attributes essential for successful flying.

The object of this paper is to discuss such physiological attributes in regard to the nose, throat, and ear, and to draw attention to the process by which these standards are being confirmed or refuted. The question of acceptance or rejection of an individual often produces sound arguments on both sides, and the writer considers some of these cases more especially in the light of international medical requirements for civilian pilots.

The Aviation Candidates Medical Board of the Royal Air Force insists that applicants with no previous experience in flying shall have hearing in either ear equivalent to a forced whisper at a distance of 20 feet; perforations of the drum, chronic suppuration of the middle ear, and a radical mastoid operation, successful or otherwise, are causes for rejection. Many men with defects of the ear or nasopharynx were trained during the war and were later found to have trouble in the air which required their discharge. These men suffered from dizziness, headaches, exacerbations of chronic suppurative otitis media, pain or ringing in the ears. But some men with defects were accepted in whom no trouble has arisen over a period of years, and, as many of them desire to become pilots of passenger-carrying aircraft, their defects become a problem for the medical examining boards.

The international medical requirements for the nose, throat, and ear are as follows:

"*Ear examination.*—The middle ear must be healthy. The aeronaut must possess a degree of auditory acuity compatible with the efficient performance of his duties.

"*Vestibular mechanism.*—Must be intact and neither unduly hypersensitive nor hyposensitive.

"*Nose and throat examination.*—The aeronaut must possess free nasal entry on either side and not suffer from serious acute or chronic affections of the upper respiratory tract.

"Each contracting State for the present is to fix its own method of examination, and no aeronaut who has given proof of his flying ability shall, so long as he retains such ability, be necessarily disqualified because he fails to fulfill all these requirements."

The writer calls particular attention to the latter clause, and he cites from the records of 450 experienced flyers whom he has examined the cases of 7 men, with from 300 to 2,000 hours previous flying, in which the middle ear was not healthy. Five of these men had never suffered any inconvenience. There was no active manifestations of disease or complications and the condition dated back to childhood. They were accepted. One man suffered from dizziness in the air, another from pronounced deafness. They were rejected. It was felt that the five men accepted had given such proof of flying proficiency that it would be unfair not to accept them, especially in

the absence of any complications of their disease. Their middle ears were not healthy, but they had always been serviceable enough for efficiency, and the public would have been the losers for the rejection of such men. During the examination of such men particular attention must be given to a search for any internal ear trouble which may be present and evidence of exacerbations of middle-ear disease in the past. Such men when accepted should be subjected to periodic medical examinations at maximum intervals of six months.

The importance of hearing to airmen lies largely in the fact that they should be able to detect engine defects and to use telephones. The writer cites the cases of four candidates in the series of 450 with from 2,000 to 3,000 hours previous flying who were extremely deaf, yet were accepted in view of their previous successful flying history.

In discussing the vestibular mechanism, the writer says: "If by 'intact vestibular mechanism' is meant a vestibule where no pathological process is or has been present, candidates whose vestibular mechanism is or has been so involved should be rejected. The phrase 'unduly hypersensitive or hyposensitive' is open, however, to much more dubiety, and in the present state of our knowledge there are diverse opinions as to its correct definition. According to Col. Isaac Jones, in his book entitled 'Equilibrium and Vertigo,' the Americans during the war laid very great stress on the Bárány tests and actually rejected candidates with a nystagmus period of under 16 seconds or over 36 seconds, after a period of rotation to right or left, consisting of 10 turns in 20 seconds. They have apparently modified this arbitrary rule, according to their official publication of February, 1920. In regard to efficient-service pilots at the front, Sydney Scott showed that the reactions of the semicircular canals do not serve to indicate a pilot's flying ability, and Bilancioni says that in normal individuals the nystagmus varies between extremely wide limits."

In a paper of the writers on the subject of labyrinthine reactions, published last year, he showed that some of the most experienced British pilots failed to satisfy American rotation standards, and concluded that "in the absence of a discovery of present or past signs or symptoms pointing to an aural affection, routine examination by means of the Bárány tests is superfluous, provided that a thorough medical examination is made." With regard to rotation tests, the Aviation Candidates Medical Board of the Royal Air Force is inclined to lay very much more stress on the ability to perform certain simple acts immediately after a period of rotation, as also on a history pointing to hypersensibility to motion in trains, swings, or ships—i. e., to what are apparently excessive labyrinthine symptoms—such hypersensibility is always carefully noted and a thorough labyrinthine examination made, especially of individuals who have trouble while flying or are without previous flying experience. In connection with

the ability to fly with an apparently unsatisfactory condition of the labyrinthine mechanism, the following two cases of civilian pilots examined are interesting:

1. B. Previous flying hours, 900. Never could stand the sensation on swings and merry-go-rounds, and always feels ill at sea. Impossible to carry out Bárány tests on him, because on rotation he immediately felt ill and begged to be stopped. Nose, throat, and ears normal, Eustachian tubes pervious. Had a crash in October, 1916, with slight concussion, and since suffered at times from nervous debility. In 1919 flew successfully as a pilot; the history of concussion places one in doubt as to whether the symptoms were purely cranial, or labyrinthine, or both. Incidentally he was a heavy cigarette smoker.

2. K. Number of flying hours, 250. In spite of this, can not stand being rotated; very quickly feels ill, and in boyhood never liked swings or roundabouts, being too much upset by the motion. No cause could be found for this hypersensibility, which, however, has not interfered with his flying career.

"The above two cases could be multiplied," says the writer, "but it must be remembered, and indeed practically every experienced pilot will agree, that the motion and effects of the rotary chair are quite different from those of an airplane, and the symptoms produced thereby are very much greater and more intense. It is almost impossible to make a fair comparison of the two forms of motion, as the chair, unlike the airplane, spins round in a small axis in the horizontal plane, and also because the labyrinthine effects produced thereby arise most markedly just after rotation is stopped, there being, of course, no such deliberate stoppage of an airplane."

It is in connection with the nose and throat and the indications for acceptance or rejection with reference to the state and fitness of the upper respiratory tract that we find in practice the most exception to theoretical considerations.

Among the 450 experienced pilots in the series 32 were mouth breathers, and only 1 of them was rejected on medical grounds, and then not because of mouth breathing.

Mouth breathing per se is presumably a disability because of the frequently associated parched buccal and pharyngeal mucous membrane, spongy gums, or excitation produced by currents of air on carious or poorly-filled teeth or unhealthy tonsils. These systems are much more pronounced in some individuals than in others, and quite a number of mouth breathers neither have nor complain of any discomfort. One must remember also that mouth breathing itself is only a symptom, sometime, but by no means always, associated with other physical or skeletal conditions such as deformed chest or highly arched palate. Again, nearly all pilots above a height of 12,000 feet begin to breathe through their mouths in order to obtain sufficient oxygen from the rarefied atmosphere. The conclusion to be drawn, therefore, is that there are quite a number of pilots in whom mouth breathing constitutes apparently no disability at all and that the assessment of any symptoms due to it is the important point.

In six men of the series, suffering from the effects of deviated septa, submucous resection was indicated in order to add to their comfort and well-being, and indirectly, therefore, to the longevity of their flying life.

Ten airmen were found in whom signs and symptoms of unhealthy tonsils and adenoids, such as marked hypertrophy, frequent sore throats, enlarged glands in the neck, repeated colds, and Eustachian tube obstruction, left no doubt that operation would be advantageous. These men in spite of their defects had flown from 140 to 2,700 hours. A large number of others with unhealthy tonsils was seen who had never had throat trouble.

The writer has considered the above groups of cases because, although various aural and upper respiratory tract potential disabilities were present, the flying efficiency of the airmen concerned has been proved by long hours of successful flight, but it must be borne in mind that these men were successful *in spite of* their defects, and one can not doubt that their standard of excellence would have been higher had they conformed to the normal. What probably happens in all such cases is that a power of compensation exists and minimizes any potential troublesome defects. The same remarks might be made with regard to refractive errors and with respect to other physical conditions diverging from the normal. The fact, however, that these men were successful in spite of their defects should not cause medical boards to deviate from the stringent standards which have been laid down for untrained would-be aviators. (W. M. K.)

Myerson, M. C. **Septicemia and death following streptococcus tonsillitis.** Laryngoscope. November, 1921.

The patient had a sore throat for four days and then suddenly became worse. A tentative diagnosis of blood stream infection was made. Cultures taken from the tonsillar crypts, from the blood stream before death, and from the heart's blood at autopsy showed a hemolytic streptococcus.

It has been repeatedly demonstrated that the *streptococcus hemolyticus* is frequently found in the tonsil crypts, figures varying from 6 per cent to 75 per cent of the cases examined. It is believed that before a severe systemic infection may result from a tonsillitis an erosion of the tonsil epithelium is necessary. This may explain the comparative infrequency of septicemia as a complication of tonsillitis; however, complications are more often met with in streptococcus sore throat than in any other form of infection. (L. H. C.)

Arrowsmith, H. **Gangosa.** Laryngoscope. November, 1921.

A case of gangosa admitted to the Kings County Hospital, New York, occurred in a laborer of Italian nativity who had never been

in the Tropics and had been in this country for a number of years. Numerous complement fixation tests for syphilis were negative on blood and spinal fluid. The colloidal gold test was also negative. Active antisyphilitic treatment was carried out with no beneficial results. Ulceration of the maxilla, pharynx, left antrum, and rhinopharynx continued unchecked, so that he was unable to maintain his nutrition. The pathological report on the tissue was granuloma (unknown origin). (L. H. C.)

NOTE.—This case was not one of gangosa such as medical officers who have served in Guam are familiar with. True gangosa, which is probably a late manifestation of yaws, responds readily to antisyphilitic treatment and the Wassermann reaction is positive. (EDITOR.)

BENEDICT, WILLIAM L. **The character of iritis caused by focal infection.** Arch. Ophth., Vol. L., No. 6.

"Iritis of focal infection origin is a myositis caused by an organism that at some period of its growth may cause iritis and at other periods inflammation of some other muscle. It is believed that this affinity for iris tissue becomes a function of the organism spontaneously, or may be acquired by growing on iris tissue, that the affinity for the iris is easily lost by the organism when grown in different environments, and that it will change its affinity for special structural tissue or even lose its virulency to a marked extent.

"As the bacteria around the teeth and tonsils are constantly undergoing changes of environment, they suffer a change of function and a change of virulency. There is also a change in the resistance of the body to bacterial invasion, so that in the human body a constant warfare is going on between bacteria and the body tissues and fluids. Iritis occurs as a localized seat of this warfare within the eye and is in all possible respects similar to reactions brought about in other parts of the body by the presence of the same bacteria at different times of the life cycle of the organism. (L. H. C.)

SINSKEY, H. L., LEVIN, M. B., AND SACKS, B. Episcleritis—A new method of approach. Arch. Ophth. Vol. L. No. 6.

"A case of episcleritis resisting the usual forms of treatment is presented, and is concluded to be of metabolic origin. After omission from the patient's diet of carbohydrate, in the form of cereals, potato, bread, and sugar, and reduction of the intake of fat a disappearance of symptoms resulted. That the relation of the ingestion of certain foods to the ocular condition is not an accidental one is evident from the fact that the patient's symptoms can be experimentally reproduced by the ingestion of the offending foods. It is suggested that in the diagnostic study and theraphy of cases of episcleritis of obscure etiology, dietetic factors be taken into consideration." (L. H. C.)

NOTES AND COMMENTS.

In connection with an answer to a query regarding the toxic effects of picric acid as commonly employed in the treatment of burns, which appeared in the January issue of the United States Naval Medical Bulletin, it is interesting to note that Bolduc, writing in the Journal of Industrial Hygiene of November, 1921, recommends the use of a 5 per cent solution of picric acid in 95 per cent alcohol as an antiseptic in open wounds, minor cuts, severe lacerations, compound fractures, and for preparing the skin for minor and major operations. Better results are claimed than with tincture of iodine, and it can be used for any condition in which iodine can be used, and, with the exception of the eye, it can be applied to any part of the body. It is less irritating and less toxic, possesses mild anæsthetic properties, and it is stable and cheap. Gauze saturated with the solution, sterilized, and allowed to dry, forms an ideal dressing, and sutured wounds treated with it usually heal by first intention, without infection, and with a resulting smooth cicatrix. Simple washing in water will remove the stain from clothing; the difficulty of removal from the skin, and its inflammability in the crystal state, appear to be its only disadvantages.

The following editorial on "Chemical warfare" appeared in the British Medical Journal, of December 24, 1921:

The policy of secrecy concerning gas warfare in all its aspects resulted in a veil being drawn across the stage of war, and only now, little by little, is this veil being pulled aside. Even when all the official histories are printed, it is not likely that the whole story will be told, but we shall know enough to study the great medical problems involved, just as the daily press is initiating the general public into some of the new and terrifying possibilities that chemical warfare holds. Secrecy was a wise precaution when our defense against gas was inadequate, and a necessity as regards our own and our allies' preparations for using the same weapon. That it, however, hampered medical treatment of the casualties and led to an unnecessary prolongation of convalescence, particularly in home hospitals, is equally undoubted.

Most of the recent publications on the subject, dealing both with medical and general aspects, have come from American authors, which is not surprising when the great gas organization built up in the United States is remembered. Nearly 1,300 chemists were allotted to various branches of research work, and we have it on the authority of General Fries, who commanded the American Gas Service in France, that at the armistice their Chemical Warfare Service,

including the gas regiments, numbered over 4,000 officers and nearly 45,000 men. The results of some of the medical research are now available, and form a valuable record of pathological and therapeutic investigation. The final results very largely confirm the opinions which had been held by British observers, who, working without the advantage of much laboratory assistance, and pressed as they were by the urgent needs of the moment, may well be satisfied that in no essential have their conclusions been proved at fault.

It will be remembered that the first employment of poison gas was by means of cloud attacks—chlorine, and later a mixture of chlorine and bromine, was liberated from cylinders and carried down wind to the opposing lines. This method of attack was gradually replaced by gas shell, whereby a variety of poisons could be used, the direction of the wind could largely be ignored, and a very high concentration of gas could be obtained on a distant target. Phosgene and other toxic substances with a similar action—notably chloropicrin—were at first the usual filling for gas shells; but the introduction of "mustard gas" in July, 1917, marked the point when chemical warfare began to be a definite factor as regards the number of casualties. Up to that time gas warfare, though harrassing to troops from the need for constant vigilance, caused a proportionately small number of casualties; but after mustard gas was freely used, casualties increased enormously in numbers, and began to influence the problem of man power very considerably.

The classification of gases adopted during the war was in accordance with the main pathological condition produced, and this may still be regarded as the most useful for general purposes. The lethal gases or lung irritants, such as chlorine and phosgene, produced their main effect on the pulmonary alveoli. The second group was named the vesicants, of which mustard gas was the outstanding member. The third, consisting of the arsine preparations, was employed in the closing phase of the war, and was the least effective weapon in the production of serious casualties, though the effects were immediate and for a short time stupefying. About this last group little has so far been published in accessible literature, largely because its potentialities are so considerable.

Mustard gas produces a chemical burn, affecting any portion of the body with which either the vapor or the fluid itself comes into contact. The effects are delayed; usually they commence six or eight hours after exposure. Then an acute inflammatory process begins, and this, if not checked, is followed by a bacterial invasion, the organisms common to the area affected multiplying on the pabulum of dead tissues provided, and setting up their characteristic lesions. The eyes, the skin, and the airway are all accessible to the direct action of this poison, and consequently suffer. Acute conjunctivitis, leading on to keratitis if neglected; a widespread erythema, followed by vesiculation, stripping of the epidermis, and extensive septic burns; laryngitis, tracheitis, and bronchitis, with sloughing of the mucous lining of the larger tubes and complicated by a descending septic broncho-pneumonia; these are the grave lesions observed. The American authors confirm the view held by the British, in opposition to the French, that mustard gas does not produce any systemic affection. The symptoms of the latter they, with ourselves, ascribe to the secondary septic infection, which may set up acute nephritis or toxic myocarditis.

In discussing the treatment of skin lesions the authors lay stress on the value of hypochlorous solutions, and the standard treatment in the American armies was based on their recommendations. It consisted of alternate treatment with eusol solution and hypertonic saline solution, to the entire exclusion of ointments. The protocols of cases treated in this fashion form a strong argument in its favor. Though masks can save from respiratory or ocular troubles, the skin is in no way protected, and as mustard gas—a fluid with a high

boiling point—can remain active on the ground for days, troops moving over a contaminated area will be exposed to the danger of burns for days after the shelling. We may note here the varying degree of susceptibility to the action of mustard gas—some individuals show a burn after an exposure of 5 seconds to air saturated with vapor, others show none after an exposure of 5 minutes, while among Negroes 70 per cent are resistant to a 1 per cent solution.

Colonel Underhill has given us a monumental work on the action of the lung irritants, which affect the pulmonary alveoli, setting up acute œdema. His book is a mass of detailed experiments, largely undertaken to investigate the blood changes. In brief, it may be stated that the blood is an index to the severity of the pulmonary condition. The initial phase is one of blood dilution, which lasts for about six or eight hours. This he regards as an increase of blood volume due to the reaction of the tissues in response to the strong irritative stimulus of the gas on the respiratory tract. This phase, during which pulmonary œdema develops, is followed by a very high blood concentration, persisting for several hours. The concentration is due to the pouring out of fluid into the lungs. This, in part a passive effect, is in a large degree due to mobilization of chlorides in the lungs, which leads to retention of fluid to hold them in solution. The tissues first are drained of fluid to supply this need, but ultimately the blood also becomes concentrated to furnish the demand of the lungs. If recovery takes place, a slow return to normal concentration follows. Associated with the œdema there is a marked degree of acidosis, but whether this is due to chlorine absorption or to a CO_2 acidosis has not been determined. Thus, physiological problems of great interest are outlined in this work.

With regard to treatment, the author advances some views which will not be fully accepted in England. He advocates venesection, and urges its employment at an early stage before acute pulmonary symptoms have supervened. This may be possible in a laboratory, where the degree of gassing is known, but it is impracticable in the field. Were it carried out it would be an enormous tax on the medical service, and would certainly mean that a large number of men would be unnecessarily deprived of a pint of blood. We agree with the value of venesection in treatment but doubt its place as a prophylactic. Associated with bleeding he advocates intravenous saline infusion (0.97 per cent NaCl.) This treatment has not been tried clinically; but in theory it is sound, and has proved of value in the laboratory. On the question of oxygen we again part company with him. His work on gassed dogs led him to attach little value of oxygen, but the British medical service in France proved its value and saved scores of lives by its use.

Major Lefebure, in his interesting book, The Riddle of the Rhine, shows how the successive developments in the use of poison gases took place, and he concludes that in future wars these gases will play an even more important part. His object is to point out the fact that now that the war is over Germany is left with eight enormous chemical factories, seven of them on the Rhine, all of which can at short notice be converted into poison gas factories capable of turning out 3,000 tons of poison gas a month. No other country is in a position to produce a tithe of this amount. Major Lefebure holds that Germany's possession of factories capable of making such enormous quantities of poison gas constitutes a menace to humanity, and discusses the methods by which the menace may be countered. The ideal method without doubt would be to abolish gas warfare, as was suggested in the manifesto published in the British Medical Journal of November 30, 1918, page 611. Failing this, however—and it seems clear that no convention, guarantee, or disarmament safeguard will prevent an

unscrupulous enemy from employing poison gas if he has the whip hand in its production—other methods must be looked for.

A great field of research has been opened up by chemical warfare. To some extent this research is of benefit to general medicine. In the main, however, we can not but regard it as a degradation of medical science that it should be called upon to assist in the study and perfection of lethal agencies. It is a strange anomaly that whilst the International Disarmament Conference is discussing control of preparations for war there should be an apparent quickening of interest in chemical means of destruction.

The medical officer of the United States Naval Rigid Airship Detachment at Howden, East Yorks, England, in his report on the destruction of the dirigible ZR–2 remarks: On August 23, 1921, the ship took to the air at 7.10 a. m. for her last trial flight before starting on her trip across the Atlantic to the United States. The crew consisted of 32 British officers and rated men and 17 members of the United States Navy, of whom 6 were commissioned officers. The ship cruised about until the following afternoon at 4 p. m., when she signaled that she would land at Howden at 6.30 p. m. She had completed her speed trials and had just started on her rudder and elevator trials while at an altitude of 2,500 feet, over the River Humber at Hull, England, when the outer cover was seen to wrinkle and the nose and tail of the ship began to drop. Almost immediately the ship broke in two and commenced to fall. The break in the structure occurred at the junction of the after and middle third. When the framework carried away all the electrical conduits were broken, one of which was carrying 2,000 volts for the radio apparatus. As these conduits parted, a short circuit produced a spark which set fire to the gasoline which was escaping from the broken fuel leads. The burning gasoline ignited the hydrogen gas which was escaping from the torn gas bags. Just before the forward section hit the surface of the Humber there occurred two terrific explosions about two seconds apart. The forward section of the dirigible was blown to pieces; but the after section fell into the river without catching on fire. Several gasoline tanks floated on the surface of the water and about them were patches of burning gasoline. Several men were seen to jump from the ship with parachutes, but when the explosion occurred the parachutes either split or were enveloped by flames, and these men were severely burned and finally drowned. Five of the 49 persons on board escaped death, 4 of whom were in the tail section of the ship which did not burn.

One officer, the captain of the ship, the only survivor from the forward section of the ship, jumped just after the explosion and was picked up among the wreckage. He was badly bruised about the eyes and had a scalp wound about 2 inches long, but was entirely con

cious, although suffering a great deal from shock. The other four men who were saved received only minor cuts and bruises. Only 1 American of the 17 aboard was saved. Three American bodies were recovered on the afternoon of the disaster. They were all burned about the face and hands, but not sufficiently to cause death. The remaining bodies of the United States Navy personnel were recovered at varying intervals, the last one being found on September 3, 10 days after the accident. Of the 16 United States Navy bodies, only 2 had sufficient injuries to cause immediate death. Commander Maxfield and Chief Machinist Mate W. J. Steele both had fractured skulls and their lower jaws were broken in several places. The other 14 men evidently received sufficient concussion from the force of the explosions to prevent them from getting free from the entangled wreckage.

The bodies of the Americans were embalmed and placed in hermetically sealed caskets by two embalmers sent to Hull by the United States Graves Registration Service in Paris. The identification of the American bodies was not at all difficult, although their faces were swollen beyond recognition. All the men had Navy identification tags, but a few of them had the tags in their pockets and lost them when their clothing was either torn or blown off of them. The identification of two of the bodies necessitated the use of the health and dental records. The fact that the medical officer of the detachment was personally acquainted with every officer and man greatly facilitated the identification of the bodies.

The disaster strongly emphasizes the importance of a strict adherence to the Navy Regulations concerning the wearing at all times of identification tags on either a chain or Monel metal wire.

In the British Medical Journal of December 31, 1921, we learn that "an element of mystery has surrounded the repeated outbreaks of plague in South Africa, and until lately the source from which infection arose has remained a matter of conjecture. Some light was thrown on this matter by Dr. J. A. Mitchell, secretary for public health and chief medical officer of the Union, in a paper read before the South African Medical Congress at Capetown last October. Plague, it appears, was introduced into South Africa during the war of 1899–1902 by rats from vessels with cargoes of forage from infected South American ports. Serious outbreaks occurred in the shipping centers, and the disease persisted in some ports up to 1905. An epizootic amongst the local rodents was found associated with these outbreaks, affecting particularly brown and black rats, domestic mice, and wild striped mice. Save for one outbreak in Durban in 1912, no cases were reported in the Union from 1906 to 1914;

plague then reappeared, not this time in the ports, but in remote farms in the Cape Province and in the Free State. The mortality was as high as 70 per cent in some of these isolated epidemics. The farms affected were often widely separated. Whence had the infection arisen? In view of the isolated situation of the farms affected and the long period of persistence, it did not seem probable that human carriers could be the cause of these outbreaks. Accordingly a rodent survey of the areas involved was made by a naturalist, accompanied by an expert trapper and tracker. The districts involved were practically free from the ordinary domestic rodents, but it was found that the gerbille or 'nachtmuis' was very common in some parts, and also the multimammate mouse. Further study showed that the outbreaks corresponded roughly with the areas of sandy stretches in which the gerbilles especially abounded. Evidence of recent migration of gerbilles and desertion of burrows was also found, and here and there dried-up carcasses or skeletons of gerbilles. These creatures are purely nocturnal, so that they are seldom seen by man, and they avoid buildings. They are gregarious and migratory, and often travel long distances at night. The almost complete destruction of jackals, lynxes, and cats, and the great development of mealie-growing, have created conditions exceptionally favorable to wild rodents in the parts of the Free State affected. The place of the domestic mouse is taken by the multimammate mouse, which lives sometimes in gerbille burrows and sometimes in dwellings or outbuildings. It is lazy, and never travels far; it prefers any cover or the burrow of some other animal to digging a hole for itself. Suspicion having fallen on these two rodents, the next step was an attempt to isolate the plague bacillus from them or from their parasites. It was found that these and other wild rodents were flea-infested, especially in summer, the many species of flea recovered including a number which bite man; these fleas were highly susceptible to plague. Repeated examinations of dead rodents were, however, always negative. Healthy wild rodents were placed in cages near suspected burrows in the hope that they would exchange fleas with the inmates, but this method also gave negative results. How direct proof was at last obtained is described in some detail by Doctor Mitchell. It would seem from the outcome of this painstaking inquiry that in South Africa the gerbille and multimammate mouse (and possibly other rodents) act as a reservoir for plague. Infection in man results from bites of fleas which have fed on infected rodents. That plague is not more common is because the complicated chain of infection between rodent, flea, and man can seldom be completed in view of the fact that these rodents rarely enter buildings. These findings are not out of keeping with those of other countries where it has been found that plague can

persist as an enzootic amongst wild rodents. In California ground squirrels have been found to harbor plague, and the original source of the terrible Manchurian epidemic of pneumonic plague of the winter of 1910–11 is believed to have been the tarbagan or marmot. The existence of this reservoir of plague is a constant menace in South Africa—a fact recognized by the public health authorities. In the destruction of these rodents gassing with carbon bisulphide has so far been the most effective method; ordinary methods of poisoning and trapping have proved useless."

The editor of the Lancet in the issue of December 17, 1921, comments on the relation of the species of rat fleas to the spread of plague as follows:

Those who are engaged in its study find the epidemiology of plague a most absorbing problem in view of the many variable factors which come into play. An investigation into the conditions commonly needed for a epidemic of human plague was carried out in a very thorough manner by the plague commission in the early years of this century. Since then research work, although greatly retarded by the war, has been going on steadily throughout the world wherever plague has manifested itself. We referred recently to the work of Kunhardt and Chitre, and have published an account of the outbreaks in some rural districts of South Africa. Attention is now drawn to the work of Maj. F. W. Cragg, I. M. S., who has further advanced our knowledge by a careful scrutiny of the species of fleas that live on the rats in various parts of India. In the October number of the Indian Journal of Medical Research he has contributed some further preliminary observations in which he discusses the geographical distribution of the Indian rat fleas as a factor in the epidemiology of plague. The plague commission workers recognized that there were several varieties of fleas on rodents in the east and they were aware that *Xenopsylla cheopis* was the most efficient carrier of the virus. Major Cragg goes into the matter much more thoroughly and shows that there are two other species met with—namely, *X. astia* and *X. brasiliensis*, and that the capacity of each of these three species to spread plague is not the same. The two most widely distributed species in India, cheopis and astia, vary greatly in this respect, the former being an efficient carrier of the infection, while the latter has little capacity to act as a vector of plague. Major Cragg, therefore, has made attempts—as yet, it is true, on no very large scale—to ascertain the species of rat flea that predominates in heavily infected areas, as also in districts which have escaped the infection or suffered only slightly from it during the present pandemic.

In response to his requests Major Cragg has received for examination 107 separate collections of local rat fleas from various Provinces, including the Punjab, the Presidencies of Bombay and Madras, Burma, and central India. These collections comprised 17,358 rat fleas, of which 9,330, or 53.9 per cent, were *X. cheopis;* 6,241, or 36 per cent, were *X. astia;* and 1,334, or 7.7 per cent, were *X. brasiliensis.* In addition there were 367 specimens of *Ceratophyllus* and 67 *Leptopsylla musculi.* The Punjab contributed 5,688 of the rat fleas, Bombay Presidency 5,183, Madras Presidency 4,491, Burma 1,697, and central India 280. The majority of the rat fleas from the Punjab and Bombay were *X. cheopis;* from Madras and Burma *X. astia,* and from central India *X. brasiliensis.* Roughly, 90 per cent of the fleas sent for examination belonged

to the two species cheopis and astia. Major Cragg frankly admits that his observations so far are neither sufficiently numerous nor evenly enough distributed to give definite results. The collections of rat fleas sent to him varied greatly in size, and at best represented only a portion of the country; they were not made in a manner calculated to eliminate the error due to the uneven distribution of the species in the particular locality they represented. Nevertheless, the results are striking. Though the nature of the records is not well adapted for the application of the statistical method by which such a problem should be approached, yet the observations, in Major Cragg's opinion, point very strongly to a close relation between the predominance of *X. chcopis* and high plague mortality, and that that flea is "the true plague flea" of India; on the other hand, *X. astia* is the predominant rat flea in those areas which are known to have remained free from plague epidemics, or which have only suffered slightly from the disease. The liability to severe epidemics of plague in those regions in which *X. chcopis* predominates seems fairly clear, as also does the absence of liability to such epidemics in areas where *X. astia* is the predominating rat flea. In his promised further report we hope that Major Cragg will correlate these facts with other factors known to influence the incidence of infection—e. g., the kind of rat inhabiting the areas, the number of fleas per rat throughout the year, and the climatic conditions of temperature and humidity which influence the breeding activity of the fleas.

To justify the full application of statistical methods it will be necessary to make a wider series of observations under definitely chosen conditions. Large batches of fleas collected at the same time of the year, preferably during the plague season, are required and the stations selected should be within fairly narrow geographical limits. When this systematic information has been obtained Major Cragg hopes to make a further and more complete report on the subject. He points out the importance of having these rat-flea areas mapped out where *X. chcopis* or *X. astia* are respectively predominant, just as the tsetse-fly belts have been mapped out in Africa. It would, he says, be unnecessary to take elaborate and expensive measures against plague in a district where the predominant rat fleas were not a species which acted as vectors of the infection. The significance of an imported case of plague may depend, therefore, in a large measure on the local species of rat fleas.

Mr. Victor G. Plarr, writing in the British Medical Journal of December 24, 1921, brings to our notice the diary of William Clift, at one time an official of the Hunterian Museum in London:

Some contemporaries insinuated that William Clift, conservator of the Hunterian Museum from 1800 to 1842, was a natural son of John Hunter, and in an early Lancet he is described as making his appearance among the distinguished audience at a Hunterian Oration "looking more like John Hunter than ever." Inasmuch, however, as Mrs. Hunter introduced young Clift into the Hunter household at Leicester Square, having, as it were received him from a lady at Bodmin whose favorite artistic prodigy the little boy had been, this scandalous and picturesque theory has but small support. From sketching in chalk on his Cornish patroness's kitchen floor he was early promoted to the position of museum artist, amanuensis, and general utility man to John Hunter himself, and, coming to know his great master and to admire his genius and his transparent honesty, he was able in time to hand on the full Hunterian tradition to the new College of Surgeons of England in a new century. A book that has probably never yet been written about, since for a number of years

it lay out of sight in a storeroom at the college, is Clift's Diary. It is in some 30 volumes and covers the period 1811–1841. Each volume is one of Richards's "Diaries" for any given year; the size is quarto, and the paper is of that excellent kind only now used in editions de luxe. Clift gave 3 shillings for his diary at each New Year, and solemnly recorded the fact of the purchase in an early page of the book. He writes a beautiful clerky hand of the eighteenth century type, which suggests a training in drawing and design, and uses the irregular forms of spelling of an age not yet confined to set rules of orthography. It is a pleasure to read these old manuscript notes and daily jottings of a man who in his generation served the college and the memory of a great man with touching singleness of heart and untiring industry and knowledge. At first sight the Diary does not appear to contain any very important entries; we are confronted during successive weeks with homely details of small expenses—items recording fourpences and twopence ha'pennies spent for string, glue, tintacks, and paint brushes used in the museum. But even among these little accounts appear more interesting facts, and we learn much about coach hire, porterage, and outlays for refreshments, suggesting that the laborer did not go dry or hungry, and about the very moderate rates of pay current in an age when the purchasing power of the sovereign was often ten times what it is at present. Thus, on June 27, 1811, we find the conservator "packing preps at the London Hospital. Bread and cheese and beer while packing, 2s. 10d." The year 1811 was very busy, for the whole of the Hunterian Collection was in process of transference from the house of "Mr. E. Jenner," adjacent to the college building, where it had been deposited in 1806 after its removal from Castle Street.

"Sunday 10 [March, 1811] Sir Wm. Blizzard, Mr. Cline, and Mr. Home met at the Museum on account of arranging Cases."

March 12. "The Giant's case to be heightened to admit the skeleton." A letter from Mr. Elers in a later diary mentions that the giant's (O'Brien's) mother was a short stout woman, but that nothing could be found out about his father.

March 26. "Removed stuffed animals into College house out of the way."

March 29. "Carrying in Dry Diseases, &c., into College house, &c., &c., for a sale of 31 lots by Mr. Creaton."

May 1. "Nails for green cloths examination table 2d."

May 2. "Mr. Harvey of St. Bartholomew's Hospital brought Ten Gentlemen, Students at that Hospital, to the Museum." These were probably the first visitors to the Museum apart from Members of the Court of Assistants or of the College staff.

May 3. "Mr. Hawkins [Master in the inaugural year of the College, 1800] and his friend called to see the Museum," and there arrived "A Mummy in a Glass case from Thebes," which Anthony Carlisle subsequently unrolled before a select audience.

On May 17 there came the first American visitor, "a friend of Sir W. Blizard's, to see the Museum."

On the 25th came the widow of John Hunter with Mrs. Campbell (Agnes Hunter).

July 12. "Received the Ostrich from Exeter Change, for which Mr. Home paid Mr. Polito's man £5 5s."

Later, arrived a lama at the price of two guineas.

The museum, now fully installed, was first opened to visitors for two days weekly on May 18, 1813. On June 11, 1816, "the museum opened to visitors for June, July, and August." Clift seems to have made a point of showing visitors

round the collection, then, as now, unrivaled. In his zealous, unaffected way, he gave his explanations to all and sundry, to students as well as to distinguished laymen. Among the former we may imagine John Keats to have been included, for we know from the college books that in the year 1816 a ticket was issued to him for Sir William Lawrence's lectures, which lasted, as Clift notes, from March 21 to May 13, when the fifteenth and last lecture was delivered. The second lecture was, "On the Various Theories Concerning Life, at Various Periods of the World." This may have excited comment, for in 1826 Lawrence, we know, got into difficulties in a publication held by his opponents to be disrespectful to "the dignity of man." Another notable course of lectures that year was was from Abernethy, who was opposed to Lawrence's materialistic views. Our discreet diarist, however, never offers comment or criticism on the ideas or utterances of the court of assistants, and we only very rarely obtain a glimpse of his private opinions, as when he notes that Mr. George Shaw, the zoologist, to whom the college presented a gold tea and coffee service, was "a dunce." Shaw's crime may have been that of getting others to do his business for him in the many volumes of his finely illustrated treatise on natural history, the plates of which are manifestly not his own work. Clift hated plagiarism, and that the services of literary ghosts should go unacknowledged. Hunter was, in a sense, ghost to Sir Everard Home, and Clift more than suspected the latter of using Hunter's notes and then destroying them. Home thus built up a high reputation which was not properly his, and Clift never forgave him. When Home, driving with him in a post chaise, confessed to his destruction of the Hunter papers in 1823, he was so taken aback that he could only stutter: "Well, Sir Everard, there is but one thing more to be done, that is to destroy the collection." The death of Home (September 1, 1832) is recorded by Clift in the Diary by the insertion of a biographical notice, quoted from a journal, at the end of which he writes grimly, in brackets, "Sic transit gloria mundi."

He did not attend Sir Everard's funeral or that of Sir Astley Cooper, but on Sunday, January 7, 1821, we read, "Mrs. Hunter died this morning. Aged 79." Clift calculates that she was 24 years younger than John Hunter at the time of their marriage. She was buried at noon on January 15, the mourners being Dr. Baillie and Sir Everard Home (brother), William Hunter Baillie and William Clift, and two other gentleman, of whom one was a painter. These were conveyed in two mourning coaches from Mrs. Hunter's house in Holles Street, Cavendish Square, "a white house," says the diarist, "east side above the middle." The coffin was buried in a vault under the new church, Marylebone. "Lady Campbell (Agnes Hunter)," continues Clift, "remained in Holles Street and, of course, did not appear." "Mrs. Hunter had been declining in health and strength gradually for some time. Dr. Baillie and Sir Everard Home thought it useless to drench her with medicine; as she had little appetite they supported her with cordials, such as weak brandy and water, etc. Being very fair, and her hair like flax, her teeth had failed her for several years; and consequently her digestion did not improve."

Of Clift's activities outside the college, such as the dissection of the bodies of criminals who had been hanged, his journeys in search of specimens, or the relations of the college with Arctic and other explorers, some account may be given at a future date.

From the Lancet of December 17, 1921, we learn that "according to Sir Berkeley Moynihan, who discoursed on 'Medicine in art' to a social gathering of Fellows of the Royal Society of Medicine and

heir friends on December 7, the proverbial hideousness of gargoyles was merely an exaggerated portrayal of abnormal conditions. The celebrated gargoyle of the church of Santa Maria Formosa, at Venice, erroneously described by Ruskin as 'leering in bestial degradation' typical of the evil spirit of Venice in the time of her decadence, was immediately recognized by Charcot as the facies of hystero-epilepsy. This was the condition so frequently described and depicted in the Middle Ages as of one 'possessed of evil spirits,' the exorcism of which was the subject of many pictures by the old masters. The attitude of the victim, characteristic of hystero-epilepsy, was more or less accurately portrayed in many celebrated pictures—for example, Reuben's 'Transfiguration,' in which the boy 'possessed of evil spirits' was drawn with spine arched backward, forearms flexed and pronated and hands firmly clenched. Sir Berkeley Moynihan showed pictures in which the artist had exhibited great anatomical knowledge in the portrayal of emotions. Sir Charles Bell, the medical artist, had drawn the face of the father in the Laocoon when he wished to portray 'anguish and the sense of impending death.' Many diseases only recently recognized had long been recorded in art. The Egyptian god, Ptah, whose images date back to 3,000 B. C., was a typical achondroplastic dwarf, and so also was the god Bess, who presided at births. In the Bayeux tapestry Turold, the horse holder, was an achondroplasiac, and many pictures such as Velasquez's 'Antonio the Englishman,' showed achondroplastic dwarfs in charge of animals. Deformities, such as talipes equinovarus and genu recurvatum, were represented in early Egyptian art, while the bust of Æsop showed the angular curvature of Pott's disease. Early Roman bronzes even portrayed the condition of hydrocephalus. One of Holbein's canvases was a faithful reproduction of rhinophyma. The late Sir Spencer Wells had always said that the famous portraying of Mary Tudor depicted the typical facies of a woman with an ovarian cyst. The craft of the surgeon was also represented in art—the operation most frequently portrayed being circumcision. Sir Berkeley Moynihan showed a picture of the removal of a sebaceous cyst by a surgeon whose diploma hung on the wall behind the patient, while he carried another in his hat. A picture in the Sistine Chapel depicted the first woman surgeon performing circumcision, while another by Moroni, even showed an early appliance for dropped-foot, the result of a wound of the external popliteal nerve."

In order to determine the therapeutic index of silver arsphenamin, three different groups of patients were treated by Abraham Strauss, D. M. Sidlick, M. L. Mallas, and B. L. Crawford, Philadelphia (Journal A. M. A., March 4, 1922), with silver arsphenamin, arsphenamin, and neoarsphenamin, respectively. The dosage employed

throughout the treatment was silver arsphenamin, 0.2 gm.; arsphenamin, 0.4 gm., and neoarsphenamin, 0.6 gm. The determination of the comparative values of the three drugs was based on the Wassermann reaction. The seropositive findings in group 1 were changed to negative in only one instance. In group 2 the positive Wassermann reaction became negative in 13 cases. In group 3 the Wassermann reaction was changed from positive to negative in 9 cases. The serologic comparisons prompt the authors to conclude that the spirocheticidal activity of silver arsphenamin is far inferior to that of arsphenamin and neoarsphenamin in the treatment of syphilis.

Experiments were made by Phillip F. Eckman, Minneapolis (Journal A. M. A., March 4, 1922), to determine to what extent, if at all, the antiscorbutic vitamins are contained in dehydrated fruits. The experiments consisted in feeding observations on guinea pigs. The dried fruits used were peaches, apricots, apples, pears, prunes, cherries, and loganberries. Water and alfalfa flour mixture were fed ad libitum, and varying amounts of the fruit were used. When scurvy symtoms were prominent and marked loss of weight occurred, the amount of fruit was increased in the effort to prevent a fatal issue of the disease. Necropsies on practically all of the animals were held, and in all cases definite evidences of scurvy were observed, such as subperiosteal hemorrhages, especially in the limbs and cheeks, evidence of intramuscular and subcutaneous hemorrhages, hemorrhagic nodles at the costochondral junctions, and enlarged and hemorrhagic suprarenals. The principal antemortem signs were marked loss of weight and appetite, subcutaneous hemorrhages, marked pseudo paralysis of the limbs, and in one case on apples a prolapse of the rectum. From these experiments it appears evident that the only one of the dried fruits tested which contains sufficient antiscorbutic vitamin to maintain the life of a guinea pig when fed in not too excessive quantities is the peach. Of this fruit it appears that 4 gm. a day although insufficient to prevent scurvy, delays it for three or four months. Although further trial did not bear it out, earlier experiments indicated some value in apricot and apples. Pears, prunes, loganberries, and cherries seemed to have even less value.

Asa C. Chandler, Houston, Tex. (Journal A. M. A., March 4, 1922) reports the results of his hookworm survey of certain parishes (counties) in northern Louisiana, made for the international health board of the Rockefeller Foundation, during which he found *Hymenolepis nana* and *Hymenolepis diminuta* as human parasites. Chandler's observations favor the distinctness of the rat and human parasite. The evident close relationship of the two, and the frequency with which rat and human parasites are interchangeable, would seem

favor the view that the human parasite has been derived as a variant of the rat parasite, adapted to live in the human intestine, somewhat as the trypanosome of Rhodesian trypanosomiasis is believed to be a variant of the parasite of nagana. If such were the case, it would not be out of the question that, under favorable conditions, these parasites, even though specifically distinct, might succeed in developing in the alternate host. Under such circumstances, rats and mice might be considered as possible but unimportant factors in the dissemination of the infection.

In the Lancet for December 17, 1921, it is stated that "from the general survey by acknowledged experts of the significance and treatment of amœbic dysentery, which took place at the Section of Tropical Disease and Parasitology of the Royal Society of Medicine on December 5, several interesting conclusions emerged. A point emphasized by Prof. L. S. Dudgeon and Sir Leonard Rogers was the present rarity of liver abscess, a complication which in pre-emetine days was computed to affect one in seven cases of amœbic dysentery. Another point generally agreed upon was that, although emetine is almost a specific in the acute stage of amœbic dysentery, it had not proved so efficacious in the more chronic and intractible clinical forms of the disease met with during the war and since the cessation of hostilities in war prisoners. The toxic effects of large doses of emetine have apparently been exaggerated; they occur only in specially susceptible individuals, and take the form of pareses of certain groups of muscles, peripheral neuritis, and a branny desquamation of the skin. Some difference of opinion still exists as to the value of the exhibition of the double iodide of emetine and bismuth; Dr. P. Manson-Bahr contended that where attention is paid to subsidiary methods, such as intravenous injection of neosalvarsan and lavage of the large bowel by eusol and to details of the dietary, these drugs produce good results in 70 per cent of cases. Red meat and starchy foods should be avoided during convalescence, and a carefully regulated regimen should be drawn up for each patient. The adoption of more uniform standards of treatment and of recording results are obviously desirable if reports from different workers are to be compared. Amœbiasis can remain latent for a much longer period than is generally supposed, and relapses have been recorded after a quiescent period of six years. It would seem that though the mortality of the disease has diminished enormously since the introduction of emetine, an absolute cure can only be hoped for when the diagnosis has been made early and the treatment has been prompt and thorough."

REPORTS.

REPORT OF THE HEALTH OF THE ROYAL AIR FORCE FOR THE YEAR 1920.[1]

The Royal Air Force was formed as a separate unit for the defense of the British Empire in 1918, and it was made up of men who had had aviation experience in the army and navy. The Royal Air Force system of medical administration differs from that of the British Army, especially in the development of station sick quarters, which follow more closely the organization of the sick quarters instituted for the Royal Navy. They are organized to provide bed space for 1 per cent of the air station personnel, and facilities for emergency treatment of serious injuries, and cases requiring isolation. They are not intended to accommodate cases requiring prolonged hospital treatment. The Royal Air Force has its own nursing service, the members of which form part of the staff in the larger sick quarters in England. The economical advantages of such a system consist in lowered maintenance charges for cases which would otherwise have to be admitted to army or navy hospitals, and in saving of men-hours and transportation expenses by retaining cases on the station, a factor of considerable importance owing to the many highly skilled mechanics employed. All cases requiring prolonged hospital treatment are admitted to civil or military hospitals.

The Report of the Health of the Royal Air Force for the year 1920, which has just been received, contains many admirable tables giving an analysis of the statistical data compiled and other information of interest to medical officers of the United States Navy.

The total strength of the Royal Air Force (excluding detachments in India) for the year 1920 was 25,932. There were 25,994 admissions to the sick list, of which number 14,309 cases were under treatment more than 48 hours. There were 115 deaths, and 573 men were invalided from the service. Of the 71 flying accidents, 39 occurred in the United Kingdom and 32 overseas, resulting in 14 deaths at home and 15 aboard. Accidents occurring while swinging propellers on starting airplanes were 25 in number. Of 102 accidents from starting motors there were 59 cases of fracture of the lower third of the radius and 8 cases of sprained wrist. The majority of these accidents occurred in cold weather because of—

[1] From Report of the Health of the Royal Air Force for the Year 1920. Volume 1. November, 1921.

"(*a*) Increased difficulty in turning the engine over in winter owing to the increased viscosity of the oil;

"(*b*) Coldness of hands, resulting in muscular incoordination;

"(*c*) The habit of priming in the winter to secure easy starting.

"The majority of these accidents can be regarded as preventable, as they are usually due to holding the starting handle with the thumb opposed to the fingers, or advancing the magneto too far."

Of 138 motor accidents other than those caused in starting motors, 68 were motor-cycle accidents. Of the remainder, the majority were caused by accidents with motor trucks and tenders. Falls from motor trucks were the most frequent.

There were 540 accidents due to athletics, 385 of which were due to football.

As was to be expected, a higher percentage of sickness occurred at recruit or concentration depots. Scabies and impetigo contagiosa were prevalent early in 1920, and investigation pointed to infrequent laundrying of the bedding, lack of sheets and pillowcases, long hair, and lack of discipline as factors bearing an intimate relation to the incidence of these diseases.

Among the Royal Air Force serving abroad, sandfly fever, malaria, dysentery, heatstroke, and sunstroke were the predominating diseases.

Sandfly fever was especially prevalent at Bagdad in Mesopotamia. "The epidemiology of this disease is still obscure and there is still much to be learned about the life histories of sandflies in general. In this connection the following extracts from a report on this subject from the senior medical officer, Mesopotamia, are worthy of mention.

The *Phlebotomus papatasii* is believed to transmit the unknown parasite or toxin of sandfly fever.

It first appears in southern Mesopotamia at the end of February, but during March and April *papatasii* are abundant. It has been frequently noted that the files are more numerous in one locality than in another, and this suggests that in the former some conditions are present which favor the breeding of these flies.

It has been observed that the phlebotomus breeds three times during the year—during April and May, July and August, and September to February; no breeding is recorded in June. It must be noted that larvæ hatching in September may remain as such until February, when they pupate and emerge at the end of February and beginning of March.

It has been discovered by breeding *papatasii* in captivity that the female does not lay eggs until at least three weeks after fertilization, and this method of research confirmed the view that she ceased ovulation during June.

Other investigations indicate that the phlebotomus breeds about 2½ inches below the surface in moist earth which contains straw or decaying vegetable matter. Most of the pupæ have been found in places where straw has been mixed with mud in making muttie walls, especially at the base of these walls, and where decaying vegetable matter has been buried beneath the surface.

In these situations many different kinds of insects are found; and the sandfly larva is said to feed on the dead bodies and excretia of other insects.

During the day the sandfly finds harborage in fissures and crevices of walls and buildings.

Turning to the conditions on the aerodrome, Bagdad, we have hutments built of muttie, which is a mixture of mud, dung, and straw, with a floor of the same material. This floor calls for repeated watering, as otherwise the huts would be uninhabitable from the presence of dust. The walls are cracked and fissured both externally and internally by the action of sun on dry mud.

Thus we have the ideal conditions for the breeding and housing of the sandfly.

If we turn our attention to the hangars, we find the same state of affairs exists. These hangars have been erected on the surface of the aerodrome, where there is a thick growth of camel's thorn. Ultimately this camel's thorn dies and decays, the floor of the hangar becomes moist as water is spilled in filling radiators, and so a perfect breeding ground for the sandfly is created.

On summer nights clouds of the pests may be seen flying just above the surface, and it has been observed that men working in hangars at night are especially prone to sandfly infection.

The velocity of the wind is a great factor in reducing the sick rates from sandfly fever, doubtless from mechanical reasons, as the sandfly finds difficulty in settling.

The wind blew from the south for the week ending August 28 and September 11, hence the slightly increased incidence. The south wind is usually almost a dead calm and is accompanied by an increase of humidity.

"Many of the statements in the above report must be regarded as still sub judice, and require further investigation before they can be regarded as finally proved or disproved."

A detachment of the Royal Air Force left England on an expedition into Somaliland in the autumn of 1919. Its average strength was 214 and its sickness during the period of the expedition represented an equivalent annual ratio of 415.9 per 1,000 of strength, excluding cases of 48 hours or less duration. There were no flying casualties, deaths, or surveys home. The expeditionary force was mainly troubled by the presence of purgative salts in the drinking water, and consequently the great majority suffered from varying degrees of enteritis.

The expedition is of medical interest in that—

"(*a*) It was the first occasion on which medical arrangements were controlled entirely by the Royal Air Force medical service. There was a Royal Air Force base hospital at Berbera, and miniature clearing stations and aid posts up country as required.

"(*b*) An aerial ambulance was used for the first time in desert warfare. The machine was a modified De H. 9 and carried one stretcher and attendant. Its value is well shown by the following extracts from private correspondence from Somaliland:

The old "blood waggon," as everyone calls the aerial ambulance, has proved a complete success. Certainly for desert warfare and the transport of sick or wounded, where hitherto only camels or pony litters have been available,

the aeroplane stands out all on its own even for the most serious cases. I must say I was inclined to be skeptical at first, and in my estimates for the transport of casualties did not count upon the aeroplane at all as it was only in the experimental stage.

This campaign has, however, demonstrated the efficiency of the aeroplane as an ambulance.

As luck would have it, our first case was X. When the hot pursuit of the mullah commenced, after we had bombed him out of his fort and hiding place at Jedali, X., although suffering from a septic toe, insisted on joining the hunt. It was a very hot chase, the Camel Corps doing 90 miles in 36 hours. X. developed general septicæmia, with lymphangitis and adenitis, and had to be carried in a litter into our advanced aerodrome at El Afweina, where he arrived in a state of collapse with a temperature of 104 ° F. The old "blood waggon" happened to be standing by and X. was immediately transferred to our advanced hospital at Eil Dur Elan where he arrived within an hour of his arrival at El Afweina—distance El Afweina to Eil Dur Elan, 75 miles, that is, 3½ days trek by camel. X. was collapsed on arrival at Eil Dur Elan; and after a short interval for rest and recovery from shock, etc., Y. opened the foot, and the whole leg was submerged in a hot stupe. At any rate, X.'s temperature was got down, and the local septic focus relieved; and after a few days rest he was again put into the aerial ambulance and transferred to Berbera—100 miles an hour—accompanied by Z. in the observer's seat. X. was, of course, a stretcher case. Two days later he was operated on—an X-ray photograph and previous clinical examination having confirmed the necrosis of middle phalanx—and the offending toe amputated, since when the patient has steadily improved and will soon be out again.

Thus the aerial ambulance has shown that, especially in operations over country where other transport is so tedious and trying, the airplane is a veritable godsend for sick and wounded.

Candidates for admission to the Royal Air Force in a flying status are examined by a board known as the Aviation Candidates Medical Board. During the period of this report 674 candidates were examined, 467 accepted, and 207 rejected.

In addition to a medical and surgical examination, together with a careful inquiry into personal and family history, it is now the practice of the board to use as a routine measure certain tests for what may be termed the physiological assessment of the individual, which may be summarized as follows:

1. Pulse rate, at rest, and response to graduated exercise, together with rate of return to normal.
2. Measurement at rest of systolic and diastolic pressure.
3. Presence of tremor of eyes, tongue, fingers.
4. Degree of ability to balance on either leg for 15 seconds.
5. Degree of ability to raise rod on board from table to shoulder level.
6. Character of knee jerk.
7. Vital capacity.
8. Length of time the breath can be held after full expiration and full inspiration.
9. Degree of power to force steadily a column of mercury as high as possible with lips and cheek held.

10. Fatigue test: Length of time 40 mm. of mercury can be sustained with the breath held after full expiration and full inspiration, together with nature of pulse during this time.

In addition, when specially indicated, other special tests are employed, such as examination by means of the rotary chair and the measurement of reflex times. The former is employed principally when there is a question of swing or train sickness or previous ear trouble; the latter chiefly in the case of officers who have already had flying experience and are referred for opinion as to flying fitness. In the preliminary examination it has, generally speaking, been found that a history of aptitude at various sports requiring eye and limb coordination is of equal value to a comparatively elaborate test carried out on a special occasion under circumstances somewhat trying to the candidate.

Certain physical standards noted in the following table are of interest:

ACCEPTED PILOTS SUMMARY.

1	2	3	4	5
	Cadets (90).	Permanent and short-service commissions (267).	Civilians (56).	War standards of tests.
Age.....yrs..	18.7	23.6	24.8	
Height:				
Standing.....cms..	175.2	173.7	173.2	[1]
Sitting.....cms..	89.8	90.1	89.8	
Weight.....kgms..	61.8	62.9	63.4	
Chest.....cms..	85.4	87.4	84.9	
Vital capacity.....c. cms..	4,502.0	4,613.0	4,448.0	4,000.0
Breath holding.....secs..	80.4	70.4	69.8	70.0
Expiratory force.....mm. hg..	124.8	131.4	126.1	110.0
Fatigue test.....secs..	63.2	59.4	59.7	52.0
Blood pressure:				
Systolic.....mm. hg..	128.5	129.6	130.2	120.0
Diastolic.....mm. hg..	81.1	81.3	80.5	80.0
Pulse rates:				
Sitting.....per min..	76.5	74.3	73.2	72.0
Standing.....per min..	86.9	83.2	80.0	84.0
After exercise.....per min..	106.0	102.5	103.3	108.0
Return to normal.....secs..	23.0	22.0	20.5	[2]

[1] Not available.
[2] Under 30.0.

NOTE.—The figures in parentheses at the head of columns 2, 3, and 4, refer to the number of cases to which the averages apply.

"The standards adopted for the 10 tests enumerated above are based on the careful examination of fit and successful pilots, i. e.,

standards of physiological fitness for endurance combined with mental attitude toward the pursuit of flying as well as to combatant service in the air. The causes of rejection, apart from visual, and ear, nose, and throat defects, are, generally speaking, conditions of the respiratory, circulatory, and nervous systems which have been found to be absent in the successful pilot and present in pilots who have broken down, as, for example, poor vital capacity, low diastolic in addition to high pulse pressure, poor response of pulse to gradual exercise, tachycardia, and presence of tremor, and other signs of deficient nervous control. The standards of the board must not be deemed unduly high—they are not. Given a healthy young individual in good physical condition, with normal vision, who has a clean family history, with especial relation to the nervous system in general and a good personal history in relation to disease, there is little doubt that he would fulfill the required standards.

"The foregoing table of successful candidates during 1920 shows the average response to such tests and measurements as were found capable of simple arithmetical expression. The averages shown are in respect of all cases for which complete records are available. The chief point of interest is the higher standards shown in postwar compared to war examinations, a fact which apparently is to be attributed to the cessation of the nervous strain of war conditions."

Certain medical research on flying personnel was carried out in India. "Investigations tend to show that after nine months' residence in any station in India there is a lowering of the average standard of physical efficiency reached in England. Also, the strain of frontier flying, owing to the nature of the country, is considerable and must remain so even in peaceful times, which are comparatively rare on the frontier. There are other conditions, physical and mental, apart from actual flying, which affect the well-being of the flying officer in India, namely:

"1. The liability to infection of malaria, bowel complaints, and the various short fevers prevalent in India.

"A flying officer is not more liable to these infections than anybody else; but if he is to be efficient in his duties there is more need for him to be in perfect physical health.

"2. Though personal hygiene is on the whole good, many officers have yet much to learn about the correct method of living in India.

"3. From the mental aspect, the fact must be borne in mind that such flying as takes place may be regarded as occurring under war rather than peace conditions over exceptionally difficult country. In this respect, however, the air officer commanding Royal Air Force, India, considers that frontier flying will lose some of its dangers with improved engines and as officers learn to fly their machines in India.

With improved games and sport facilities, also, physical fitness should show distinct improvement."

The chief disabilities found to affect flying officers in India may be classified as follows:

"(1) Physical inefficiency due to—

(*a*) Tropical diseases—

(*i*) Malaria, sandfly fever, and other pyrexias of short duration.

(*ii*) Colitis, dysentery, and diarrhea.

(*b*) Lack of opportunity and proper care in keeping fit, especially when considered in connection with climatic conditions, such as glare and high wet-bulb temperature.

"(2) Inefficiency due to mental causes—flying stress caused by nature of country, etc., and in some cases domestic worry."

Regarding malaria, investigations suggest that this disease and its sequelæ, and possibly the administration of quinine, are closely related to the development of oxygen-want and flying stress in high altitudes; but there is no reason yet revealed why a pilot after suffering from malaria should not be in every way as efficient as he was before, provided that suitable time and treatment is given in direct ratio to the severity of the attack.

The following comments on glare and its effects are of interest:

"Glare is a persistent factor at all seasons of the year, but it undergoes natural and marked variations in intensity. During the summer months at stations on the plains few people can deny that they are influenced by its effects to a greater or lesser degree. There is no doubt that glare as experienced on the ground is ameliorated by altitude. When a machine has attained a height of about 500 feet the difference is appreciable. The intense, irritating, almost painful reflections from the light gray roads and dry grazing fields slowly relax their effects and become modified. At a height of 2,000 to 3,000 feet the change is very apparent, and one can observe the landscape without noticeable strain. It is, therefore, on taking off and on landing that glare effects during flights are most apparent.

"Optical effects of glare may be subjective or objective.

"The most noticeable subjective effects fall roughly under four headings:

"(*a*) Photophobia.

"(*b*) Headache.

"(*c*) Sensation of necessity to 'screw up' the eyes.

"(*d*) Ocular pain.

"Objective signs may be enumerated as follows:

"(*a*) Conjunctival injection.

"(*b*) Blephorospasm.

"(*c*) Contracted pupils (with a tendency to sluggishness).

"(*d*) Signs of heterophoria of varying degrees.

"Most of these signs and symptoms explain themselves and are the manifest result of continued ocular strain brought about by a persistent irritating stimulus. With the exception of contracted pupils they do not call for further discussion. As regards heterophoria it may be stated that, when considered as a whole, up to the present there are few pilots suffering from the condition in any marked degree, nor can even a small number of minor flying accidents be ascribed to "incoordinated ocular muscular balance," although bumpy landings are not infrequent. It would be unwise, however, to assume from this that such a state of affairs will persist, for it is obvious that time is a great factor in this connection. After five years of flying have passed by, it will be more possible to pass an opinion in this respect. In the meantime means must be found to neutralize the effects of glare intensity without producing unnatural landscapes. On this account special experimental goggles fitted with a various tinted lens of Crookes's glass have been sent to India for test.

"One of the most marked features demonstrable during routine eye examination in India is the peculiar reaction so consistently found to the official Royal Air Force test for true judgment of distance (the orthotelemeter). Even when tests for convergence and heterophoria show nothing that can be called abnormal, the readings in respect of judgment of distance often show remarkable variations.

"In England the maximum visual error is regarded as 30 mm. either side of zero and individuals giving a reaction outside this fall naturally and correctly under the heading of 'possible erratic landers.'

"In India, under exactly similar conditions, and employing an orthotelemeter supplied by the Royal Air Force Medical Research Laboratory, it is exceptional to find a case in which the limit of 30 mm. is not trespassed. Under these circumstances one would expect to find bad or at least bumpy landings to be common, but in practice this is not so.

"It may be stated as a general fact that, excluding the orthotelemeter readings, all other tests are chiefly characterized by normal response. It remains, therefore, to discover the factor which exercises its maximum influence over the orthotelemeter readings while it maintains a state of apparent inactivity in respect of other visual tests. As a possible explanation, the effects of glare upon the ciliary muscles may be put forward. It is reasonable to assume that intense light might produce slight tonic or clonic spasms in the ciliary muscles with resulting variations in the thickness of the lens; this would, in turn, produce a state of alternating myopia and hypermetropia and yield at once the normal readings observed.

There is some evidence, however, that a mental factor may also be involved.

"Some protection for the eyes, particularly during the period from April till October, is essential. Tinted glasses of an ordinary nature are of little real value. Pilots object strongly to using them because they cause unnatural landscapes; and there is no question that they bring objects apparently nearer than they really are, and in this respect do more harm than good. Chlorophyl goggles are the best of a bad lot and can not be recommended for pilots. Trials are now being made of Crookes's glass of various tints. To attain the ideal, a glass is required practically colorless and yet gifted with the power to cut out the harmful rays."

In one of the concluding sections of the report the functional nervous disorders among Royal Air Force officers during 1920, and their causation, are discussed.

"The cases were such as in modern psychological terminology would be called 'psychasthenia' or 'psychoneurosis' (the form with 'anxiety states'). No cause of 'suggestion neurosis'—the hysteria of official nomenclature—was recorded.

"In the causation of 'anxiety states' the same predisposing factors alone or combined, usually the latter, were operative as occur in civil life, viz, actual ill health, uncertainty as to future prospects, private and domestic worries, financial troubles, etc. Additional causes operative in the postwar service were (1) the necessity for realization by officers of their peace-time responsibilities for public money, stores, etc., and (2) the effect overseas of tropical disease and climate and the monotony of 'hot weather' life in lowering physical and mental efficiency.

"Regarding actual flying as a predisposing cause, it is to be doubted whether the mental strain of flying under peace conditions is ever felt again so acutely by a pilot as it was before his first solo and during his early training.

"Flying over mountainous and hostile country, such as the north-western frontier of India, with few places where a forced landing could be effected, is a strain if kept up for months on end. Apart from this, experimental pilots complain after a time of the 'monotony' of flying.

"The following table tends to bear out the conclusion that a healthy pilot, given that he has the mental aptitude for flying, is able to 'repress' successfully any but normal reactions to the occasional risks of flying, and to remain unconscious of any other types of reaction.

"The table also shows the ostensible senses to which the condition has been attributed by the patient or his board. No attempt has been made in it to follow up deeper underlying causes."

TABLE SHOWING THE OSTENSIBLE CAUSATION OF FUNCTIONAL NERVOUS DISORDERS AMONG OFFICERS DURING 1920.

Causation.		Officers remaining in R. A. F., March, 1921.	Officers no longer in R. A. F., March, 1921.	Total.	
Flying stress	At home	4	4	8	18
	Abroad	7	3	10	
Crash, recent	At home	2	1	3	5
	Abroad	.....	2	2	
Crash previous to 1920	At home	.....	11		12
	Abroad	1			
Strain of administrative work	At home	8	3	11	18
	Abroad	2	5	7	
Disease	At home	1	1	2	11
	Abroad	6	3	9	
Domestic and personal trouble		4	6	10	
Nonflying accidents		1	1	2	
Result of previous service		1	5	6	
Prisoners of war		4	.....	4	
Total		41	45	86	

NURSE CORPS.

ODD NOTES.

Dr. Ethelberta Claremont in the Lancet writes on "Shortening of the post-operative convalescence," based on experiences at the Zurick Klinik:

"The method of post-operative treatment carried out is unusual and startling, but an examination of the results leaves no doubt as to the soundness of the method. Although this method is applied to the after treatment of operations on all parts of the body, the article which is reviewed is confined to abdominal operations.

"The whole system is concentrated on having the patient out of bed at the earliest moment after operation. In the absence of any contraindication, such as fever or the insertion of a drain, the routine practice is to seat the patient in a chair for half an hour on the day following the operation; or in the evening if the operation has been early in the morning. On the second day the patient walks the length of the room and sits out of bed for a longer period or for two short periods. Thereafter the length of walk and the time out of bed are increased. When Michel's clips are used, they are removed, as usual, on the fifth day and stitches come out on the sixth or seventh. The patient walks out of the hospital on the tenth.

"While this method is applied only to those cases in which the abdominal cavity is primarily closed, it is employed irrespective of the size of the operation wound and the nature of the operation. Although some of the cases had laparotomy wound extending almost the whole length of the abdominal wall, there were no ill effects and during observation covering a year no case of ventral hernia occurred after this treatment. Cases complicated by fever or primarily drained are kept in bed until the fever subsides or the drain is removed.

"The technique of suture in the Zurick Klinik is very thorough. With the exception of the peritoneum, all layers are sutured with very closely placed interrupted stitches; catgut being the material usually employed. Continuous silk is sometimes used for the peritoneum but never thread.

"A patient suffering from shock can not get out of bed. Cases of shock, however, are rare even allowing for the great length of time taken by the operation owing to the exact and precise technique.

Two reasons are given for the decrease in post-operative shock. The first is that preoperative purging is unknown; the bowels are regulated, but no attempt is made to purge even for operations on the intestines. The second factor is the employment of local anæsthesia.

"In conclusion, it is stated, no absolute rule can be laid down. Each case must be treated according to the nature and circumstances. It is recognized, however, that the mere fact of lying in bed for any considerable number of days produces in itself an illness, both mentally and physically, without the complication of the addition of an operation. The mentality of the patient becomes impaired by the monotony of existence and by complete dependence on others, while the physical side degenerates rapidly following on the wasting of muscle and the disturbance of intestinal and other activities. It is suggested that in the case of patients who are physically "run down," to whom the operation is not an urgent matter, there should be recuperation before rather than after the operation."

NOTE.—It is assumed this treatment is regarded as "recent," but the reviewer remembers the case of a Navy nurse, a patient in a civilian hospital in New York in 1910, from whom a large cyst (approximately 24 pounds) was removed, who walked from her bed on the fifth day and walked from the hospital on the tenth day. No complications followed this treatment. Cases of appendectomy at the Mayo Brothers Hospital have left their beds on the third day.

An interesting article on the effect of "Cooling power of the atmosphere on body metabolism" is given in the Journal of Physiology, the summary of which is as follows:

"Experiments are recorded showing the effect of out-of-door and indoor conditions upon metabolism. It is considered that the basic metabolism of the body cells is raised by cool out-of-door conditions and that shivering is not necessary to raise metabolism.

"The metabolism is controlled by cooling power, not by temperature. Previous results are confirmed and formulæ suggested for rapid calculation of heat production of the resting subject under comfortable indoor conditions and under cool out-of-door conditions. It is considered the former may afford important information regarding patients with fever."

In John Burroughs's last book, "Under The Maples," he states, on page 196, "You can not poison a hen with strychnine." Doctor Fisher, in charge of the Economic Investigation Bureau of Biological Survey, gave in effect the following reply when the subject was referred to him:

"The statement by Mr. Burroughs regarding the effect of strychnine on domesticated fowls is correct. Chickens and the gallinaceous birds seem to be practically immune from the effects; the reason is not yet known. Extensive field operations show that a quail weigh-

ing not over 5 or 6 ounces will eat with impunity enough strychnine-poisoned grain to kill squirrels weighing in the aggregate of 20 pounds. In operations against injurious rodents over 5,000 tons of poison grain have been distributed and to date not one game bird has been destroyed by these experiments."

Well-known medical authorities believe that food cured with saltpeter is injurious to the system. It has been found that patients suffering from neuralgic headache and so-called rheumatism have been released from pain and have improved in health by refraining from eating cured meats and fish.

There is a foundation for the story of Cyclopeans. Within the head of every one there is found to be a third eye. Fossil remains of some of the gigantic lizards proved they possessed a third eye which may have been a kind of periscope; the two chief eyes submerged while the third watched above the water. The remains of the third eye still performs useful functions. It has become the pineal body which governs development from child to adult—without it one would not grow up.

The mechanical clock was suggested by the human pulse. The oldest clock is the sundial; then came the water clock, consisting of a peg floating in a vessel of water which escaped from a hole in the bottom of the vessel, lowering the peg as the water sank; the rings painted or etched on the side of the vessel indicating the division of time. Then came the hourglass; next the hour candle dip. The minute hourglass remains with us and is used for some household purposes. The idea of the pendulum in the mechanical clock came from watching the rhythmic swing of a mason's plumb line.

COURSES OF INSTRUCTION FOR NURSES.

Three members of the Nurse Corps are at present taking a course in nutrition at the School of Home Economics, Battle Creek Sanitarium. This course will end in June and the Surgeon General hopes that three or more applications for the next course will be submitted in sufficient time to make the necessary arrangements.

Three nurses are assigned to the naval hospital, New York, for instruction in physio, hydro, and electrotherapy; upon completion of this course to be assigned to duty at the naval hospital, Chelsea, for purposes of instructing other nurses and developing treatment in this department.

Two nurses have requested an opportunity to take the summer course at Leland Stanford Junior University, Berkeley, Calif., and two nurses have made the request to take the same course at Columbia College, New York. The Surgeon General hopes to be able to approve these requests. It is hoped that in May a small class of nurses will be assigned to duty at the Naval Medical School for instruction in laboratory work.

While the courses of instruction for nurses naturally are limited to a definite number, the Surgeon General will appreciate receiving requests from individual nurses, in order that the work may be planned for the present and future years. While the commutation for subsistence and quarters will probably be reduced during the coming year, it is believed the amount allowed will be sufficient to meet the actual living expenses of the nurses who are given the privilege of courses of instruction in other institutions than those of the naval hospitals.

RECENT PUBLICATIONS SUGGESTED FOR READING.

Outwitting Our Nerves. By Dr. Josephine A. Jackson and Helen M. Salisbury.

A book in which the authors bring out lucidly the amazing features of the mental side of humans to cope with, and more than offset, handicapping physical trouble.

The Home of Echoes. By F. W. Boreham.

His praise of "Second Hand Things" is charming: "If only my ears are not too heavy, I may catch, breaking through the most somber moments, life's very sweetest songs."

United States Citizenship. By George P. Mains.

"If true to the ideals of her founders, if true to her own possibilities, America is clearly ordained for the financial, intellectual, political, and moral sovereignty of the coming ages; and if true to her mission, the nations will spontaneously install her as leader in the universal civilization."

Psychology and Mental Hygiene for Nurses. By Mary B. Eyre.

The purpose of the book is to show the place of psychology and mental hygiene in the work of the nurse. "It has been written with the average nurse in mind, after many years of instructing and loving her. When interest is aroused, there is a vast field for enlargement of the topics presented." Of particular interest are the chapters dealing with the life force and human behavior and the psychology of occupation. The presentation of this subject will appeal to the nurses in that it is capable of being applied to the everyday problems of their professional work, particularly in institutional work.

DIGEST OF DECISIONS.

7657-390 : 39-a
G-Br

DEPARTMENT OF THE NAVY,
OFFICE OF THE JUDGE ADVOCATE GENERAL,
Washington, 28 June, 1921.

From: The Judge Advocate General.
To: The Chief of the Bureau of Navigation.
Subject: Laramore, Herbert Franklin, hospital apprentice, second class, U. S. Navy. Status of for purpose of reimbursement or payment of bills for medical services for injuries received while on leave of absence.
Reference: Your letter April 26, 1921 (EMB-SMS, PR&R 453229), to the Judge Advocate General.

1. In reference you state that Herbert Franklin Laramore, hospital apprentice, second class, U. S. Navy, was given leave of absence from the Hospital Corps Training School, San Francisco, Cal., from December 18, 1920, to January 3, 1921, for the purpose of returning to his home. You further state that while hunting near his home, Livingston, Texas, December 28, 1920, he accidentally shot himself in the left leg, which act necessitated an amputation of that leg about six inches below the knee. On December 29, 1920, this accident was reported to the commanding officer of the Hospital Corps Training School at San Francisco, who communicated with the Bureau of Medicine and Surgery and the Bureau of Navigation. It further appears that no naval medical officer or naval hospital was available there and that his commanding officer on or about December 30, 1920, extended the leave of absence of this man until such time as he could be transferred to the naval hospital at New Orleans and directed that he be detained where he then was until he had recovered sufficiently to make the journey to New Orleans, at which time he would proceed to that hospital at private expense, but that in the meantime they should keep the commanding officer informed as to his physical condition.

2. An opinion of the Judge Advocate General is requested as to whether or not the above-named man was in a duty status for the purpose of paying the bills for medical and hospital services required.

Section 1187, Navy Regulations, 1920, provides as follows:

"Officers and enlisted men of the Navy and Marine Corps, when on duty at a place where there is no naval hospital, may be sent to other hospitals, upon the order of the commander in chief, or the senior officer present, and the expenses of such persons shall be paid from the naval hospital fund; and no other charge shall be made against their accounts than such as are made for persons under treatment at naval hospitals."

3. It is clear from the facts in this case, as contained in paragraph 1 above, that Laramore was not on duty within the meaning of section 1187, Navy Regulations, nor was he given medical treatment in other than a naval hospital upon the order of the proper naval authority. The commanding officer, in extending Laramore's leave to such a time as he could safely travel to the naval hospital at New Orleans, did not authorize, as provided for in the above-cited section of the Navy Regulations, his treatment in other than a naval hospital, nor did it place Laramore on duty in the meaning of that regulation.

4. Since 1907 the Army appropriation acts have provided under the title "Medical and Hospital Department" for the care and subsistence in private hospitals of officers, enlisted men, and civilian employees of the Army, of applicants for enlistment, and of prisoners of war and other persons in military custody or confinement, when entitled thereto by law, regulation, or contract; but officers and enlisted men who are treated in private hospitals or by civilian physicians *while on furlough* are excepted therefrom. (41 Stat., 969.) There is no law making the provisions of the Army appropriation act of June 5, 1920 (41 Stat., 969), above referred to, or similar provisions found in former Army appropriation acts, applicable to the personnel of the Navy.

5. It was said in the Comptroller's decision of January 5, 1899 (5 Comp. Dec., 364):

"When the leave is extended on account of sickness or any other cause, or absence in excess of leave is excused as unavoidable, the status of the soldier remains the same, so far as the matter under consideration is concerned. He is not on duty, and I know of no law or regulation authorizing payment for his medical attendance while so absent.

"I think the long-established ruling of this matter is sound. If an officer or soldier chooses to put himself out of the reach of medical attendance which the Government has provided in hospitals, etc., he can not place the Government under obligations to pay any expense he may incur for medical attendance."

Again in the comptroller's decision of December 28, 1912 (19 Comp. Dec., 382), it was held that an enlisted man of the Navy is not entitled to medical treatment at public expense while on leave of absence or furlough, the comptroller saying in that opinion that:

"The Government maintains efficient medical corps in the two branches of the military service with well equipped hospitals at posts and stations, and when officers and men are assigned to duty where the regular medical establishment is not available the necessary treatment by civilian physicians is furnished. But even when officers are *on duty* but choose to occupy private quarters out of the vicinity of the medical force they are not allowed treatment by civilian physicians at public expense (3 Dig. 2d Comp. Dec., sec. 788; 17 Comp. Dec. 472); and when a man is on leave from all duty and goes where he pleases it is not reasonable that the Government should be required to follow him with medical treatment wherever he may go."

The circumstances of that case is on all fours with the case now under consideration.

6. In view of the foregoing, and of the fact that I know of no law or regulation supporting Laramore's claim in this case, I am of the opinion that he was not in a duty status for the purpose of reimbursement for the expenses incurred for treatment as a result of the injuries sustained by him on December 28, 1920, and your query is answered accordingly.

(Sgd.) J. L. Latimer.

Approved, 13 July, 1921.

(Sgd.) Edwin Denby,
Secretary of the Navy.

LINE OF DUTY AND MISCONDUCT CONSTRUED.

A man who had been sentenced to 18 months' confinement in a naval prison, for an absence of several months, was found by a

board of medical survey to be suffering from tuberculosis, chronic pulmonary. From the facts it appeared that the disease was incurred while he was serving sentence, no facts were presented to show that it was the result of his own misconduct or that it was in any way connected with the sentence imposed, nor that it had not been contracted while in a duty status—Held in line of duty, not misconduct.

BOOK NOTICES.

Publishers submitting books for review are requested to address them as follows:

The Editor,
U. S. Naval Medical Bulletin,
Bureau of Medicine and Surgery, Navy Department,
Washington, D. C.
For review.

Books received for review will be returned in the absence of directions to the contrary.

REVIEWERS.

Lieutenant Commander W. M. KERR, Medical Corps, United States Navy.

"Some books are to be tasted, others to be swallowed and some few to be chewed and digested."—BACON.

THE DIAGNOSIS OF INTERNAL MEDICINE, BY *G. R. Butler, M. D., Sc. D. LL. D., senior physician, Methodist Episcopal Hospital, Brooklyn, N. Y.* Fourth edition. D. Appleton and Company, New York, 1922.

More than 20 years have passed since Doctor Butler gave to the medical profession the first edition of his "Diagnostics of Internal Medicine." The volume immediately attained a popularity almost unprecedented in the history of medical publications. It was written from the point of view of practical clinical work, filled a long-felt need, and its popularity has increased with each edition.

Within a comparatively short time great strides have been made in clinical diagnosis, and this progress is reflected in the additions to the text one notes on a perusal of the new edition which has just appeared.

As is stated in the preface to the fourth edition, "The new material relates in large part to renal functional tests, blood chemistry, blood pressure, the cardiac arrhythmias, and the examination of the heart, blood, nervous system, stomach, and intestines. The sections on diseases of the kidney and endocrine system especially have undergone revision. There is a new section on the differential diagnosis of acute abdominal diseases. Proper consideration has been given to recently studied diseases and conditions, such as acidosis, epidemic encephalitis, hilus tuberculosis, botulism, Vincent's angina, effort syndrome, diverticulitis, the immediate and remote effects of war-gas poisoning, and others."

Doctor Butler has been materially assisted in the revision by many men eminent in their specialty, which increases the value of the edition. The entire volume has been recast, yet the form of presenting the subject, which was found so convenient by medical students and practitioners in the previous editions, has been retained, namely, a study of symptoms and their indications, the evidence of disease, followed by a study of diseases and their characteristics, and diagnosis.

The portion of the volume devoted to a study of the evidence of disease comprises a consideration of the practical points in the clinical anatomy and physiology of certain organs; a description of the approved methods of examination; a consideration of the signs and symptoms met with in the practice of internal medicine; and a statement of the diagnostic significance of each sign and symptoms. That portion which deals with diagnosis contains descriptions of recognized diseases and their symptoms with special reference to the diagnosis of each disease. (W. M. K.)

THE PREVENTION OF MALARIA IN THE FEDERATED MALAY STATES, BY *Malcolm Watson, M. D., chief medical officer, Estate Hospitals Association, Klang, F. M. S.* Second edition. E. P. Dutton and Company, New York, 1921.

Campaigns against malaria have been successfully carried out in many localities, but notably in the Panama Canal Zone, in Italy, and in Ismailia. American medical men are familiar with the work at Panama and the results obtained, but few are cognizant of the efforts to eradicate malaria from the Federated Malay States which have been in progress during the past 20 years.

The Malay Peninsula, lying just north of the Equator, possesses a climate that is equable, hot, moist, and without extremes of either heat or cold. Never was there a climate better suited to the propagation of mosquitoes, and in that land the Culicidæ are well represented. The region possesses great natural resources, a handy labor market and an intelligent population, factors which make for wealth and success; but the prevalence of malaria hindered the development of the country.

To Dr. M. Watson of the government medical service fell the task of eradicating the disease, if possible. He went to the Malay Peninsula not many years after Sir Ronald Ross had demonstrated the method by which the malaria parasite was transmitted, and he studied the disease from every angle, and its prevention by every method, in towns, villages, and on plantations. At first the work of eradicating malaria seemed hopeless—every well, ditch, and swamp teamed with larvæ. The active cooperation of the natives could not be counted upon, resistance was certain if compulsory administration of quinine was enforced. Mosquito nets were ineffec-

tual, screening of houses too costly. With an area of country so extensive, subsoil water so high as to form permanent swamps, and aquatic vegetation so dense, the clearing out or dealing with individual collections of water in any continuous manner was impossible. Doctor Watson determined early in his work that by draining and filling, there would be a large and permanent reduction of the breeding places of mosquitoes with a consequent diminution of malaria and that any expenditure of funds should be on work of a permanent nature.

It was a fortunate choice of methods and it has been successful far beyond his expectations.

In 1911, 10 years after his work had begun, he published the results of his efforts up to that time, but the first edition of the book he wrote has long been out of print.

The fruits of 10 additional years are contained in the second edition, which has recently appeared, and the reader of this ably written volume may learn how much can be done in the control of malaria by the method of anopheline reduction, especially in the country.

Doctor Watson's problem was far more complicated than is ordinarily the case. His operations extended over thousands of square miles of territory and involved the sanitation of many estates or plantations. Many varieties of Anopheles were found to be malaria carriers and each had its own special habitat. In the virgin mangrove swamps, for instance, malaria is transmitted by *A. umbrosus*, but if man cuts the mangrove forest letting sunlight into the land, *A. umbrosus* disappears, but *A. ludlowi* will take its place and breed in stagnant pools. By proper drainage and the construction of "bunds" both of these offenders are eliminated. In the low coastal hills which are covered with jungles and possess small streams choked with grass, *A. umbrosus* and *A. maculatus* are found. If the jungle is cut and the streams cleared, *A. umbrosus* disappears, yet malaria may persist because *A. maculatus* will breed in streams which are absolutely free from grass and weeds. This offender, however, can be abolished by subsoil drainage or by spraying with oil.

The inland hills of the peninsula become intensely malarial when the ravines are opened and cleared, because *A. maculatus* then appears in them. Doctor Watson believes that malaria can be avoided in future attempts to cultivate the inland hills by not felling the jungle in the ravines.

Although malaria is essentially a country disease, the story of Doctor Watson's antimalarial campaigns in the towns of Klang and Port Swettenham are almost dramatic. The book contains splendid chapters on the effects of malaria on Europeans and on coolies, on

quinine, on various estates. Dr. A. R. Wellington contributes an account of the successful antimalarial campaign in the town of Kuala Lumpur, and Dr. P. S. Hunter a chapter on the antimalarial work at Singapore. The book is beautifully illustrated and is a volume which should be in the library of every medical man practicing in malarial districts. (W. M. K.)

CHEMICAL WARFARE, by *A. F. Fries, Brigadier General, C. W. S., U. S. A., and C. J. West, Major, C. W. S., Reserve Corps, U. S. A.* McGraw-Hill Book Company, New York.

This is a remarkable book in that it deals with matters which were but a short time ago profound secrets. The officers of the Chemical Warfare Service believe, however, that the story of chemical warfare should be told, partly because of its historical value and partly for its educational value. In spite of the revelations in this book, we must not forget that secrecy must still be maintained regarding some of the facts and some of the new discoveries which are the property of the service. Chemical warfare has come to stay, all plans of the Disarmament Conference notwithstanding. In the late war 27 per cent of American casualties were from gas alone and, as the authors remark, the use of gas in that war was a child's game compared with what it will be in the next conflict. The use of gas must be one of the principal elements in the future strategy of war. In the late war it proved to be an effective weapon, and history proves that no effective implement of war has ever been discarded so long as it remains effective.

The authors outline the development of gas warfare from the use of cloud gas which was transitory in its effects, to the persistent gases, the effectiveness of which may last for days; they tell of the development of the Chemical Warfare Service of the United States Army and of its activities in France; and they discuss some of the processes of manufacture of the various gases. They describe the various steps in the development of the gas mask and other defensive measures; they tell of screening smokes, toxic smokes, and incendiary materials, all of which are matters with which the naval medical officer should be familiar.

The authors claim that gas warfare is humane. It sends many men from the fighting line for a few weeks, but it kills or permanently injures relatively few.

The number of recorded deaths in hospitals from gas, including both officers and enlisted men of the United States Army, was 1,221, and not over 200 died outright on the battle field from this cause. The latest available statistics show that there were 260,783 casualties in the American Army abroad during the war. Of these, 70,752, or 27 per cent, were gas casualties, leaving 190,031 casualties from all

other causes. Considering that 27 per cent of all casualties in the war were due to gas, it is evident that gas is one of the most powerful instruments for causing casualties yet produced. On the other hand, realizing that the total number of deaths from gas was but 1,421, while those resulting from other battle implements numbered 48,964. we see that gas results in a very low morbidity, in fact twelve times less than that produced by other methods. In the concluding paragraph of this interesting book the authors say:

"It is just as sportsmanlike to fight with chemical warfare materials as it is to fight with machine guns. The enemy will know more or less accurately our chemical warfare materials and our methods, and we will have the same information about the enemy. It is thus a matching of wits just as much as in the days when the Knights of the Round Table fought with swords or with spears on horseback. The American is a pure sportsman and asks odds of no man. He does ask, though, that he be given a square deal. He is unwilling to agree not to lose a powerful weapon of war when he knows that an outlaw nation would use it against him if that outlaw nation could achieve success by so doing. How much better it is to say to the world that we are going to use chemical warfare to the greatest extent possible in any future struggle. In announcing that we would repeat as always that we are making these preparations only for defense, and who is there who dares question our right to do so?"

The fact that gas will be used to the fullest extent that the resources of the participants will permit, may do more to prevent war than any peace propaganda ever devised. (W. M. K.)

A Textbook of Bacteriology by *Hans Zinsser, M. D., professor of bacteriology, College of Physicians and Surgeons, Columbia University,* with a section on pathogenic protozoa by *Frederick F. Russell, M. D., Colonel, Medical Officers' Reserve Corps, U. S. A., professor of bacteriology and pathology, Army Medical School and George Washington University.* Fifth edition. D. Appleton and Company, New York, 1922.

One notes on a perusal of the fifth edition of the Textbook of Bacteriology by Hiss-Zinsser and Russell, which has just come from the press of D. Appleton and Company, that in the revision of the text many important changes have been made, both in additions and in the manner of the presentation of the subject.

Many of the sections dealing with the pathogenic microorganisms appear to have been completely rewritten, and it is noted that brief clinical data have been added to the discussions of the various infective agents, together with brief considerations of the principles underlying sanitary procedure, all of which increases the value of the book to the student and general practitioner.

Dr. Hans Zinsser, who collaborated with Dr. P. H. Hiss, jr., in the preparation of the earlier editions of this book, occupies the chair of bacteriology at the College of Physicians and Surgeons, Columbia University, New York. He has made use of the laboratories of the college to try out all of the bacteriological procedures which have been advocated in the literature from time to time, and he has eliminated from the text of the new edition all those procedures which have been found of little value to the general laboratory worker, incorporating only those which have been found of practical utility.

In that section of the book which deals with immunology we are pleased to see that consideration has been given only to the more important principles and practical methods needed by the routine laboratory worker.

An important and useful addition to the book are short sections on the normal bacterial flora of the human body concerning which much important work has been done in recent years by Herter, Kendall, Rettger, and others.

The diagnostic and therapeutic principles in which bacteriological and immunological reasoning and technic are involved have been admirably dealt with, and much clinical and epidemiological data has been included, which adds considerably to the value of the book for those who are interested in microorganisms, particularly in their relationship to clinical and preventive medicine.

Professor Zinsser has called to his aid in the task of the revision of this well-known textbook, men eminent in their particular specialty. Col. Frederick F. Russell, formerly of the Medical Corps, U. S. Army, whose work in connection with antityphoid vaccination made his name familiar to medical men throughout the world, has revised the section on protozoa. Dr. J. G. Hopkins, associate in the bacteriological department of the College of Physicians and Surgeons, Columbia University, who has recently devoted much attention to the pathogenic molds, has rewritten the section dealing with these organisms. Dr. J. Howard Mueller, assistant professor of bacteriology, has revised the sections dealing with the chemical metabolism of bacteria. Miss Ann Kuttner has elaborated and revised the chapter dealing with the anœrobic infections which gained such an important place in the study of traumatic injuries during the war; and Dr. Oscar Teague contributed suggestions in connection with the chapters on cholera and plague.

As the authors say in the preface: "Bacteriology and the reasoning based on bacteriological and immunological discoveries have become more and more closely interwoven with the clinical and public health aspects of infectious diseases. Indeed, if this had not been sufficiently apparent before 1914, the experiences of the late

war have demonstrated, conclusively, how impossible it is to organize either hospitals for infectious diseases or organizations for the control of epidemics without the intimate participation of men trained in bacteriology. It seems to us, also, to have become apparent that the bacteriologist who takes an active part in the work of a hospital or in directing sanitary undertakings must have a very thorough understanding of the clinical and public health aspects of the problem as a whole.

"The conception upon which the preparation of the new edition of the book has been based, therefore, is the belief that no thorough understanding of the clinical problems of infectious diseases or of larger public health measures can be attained without thorough familiarity with the bacteriological and immunological facts upon which clinical and sanitary reasoning must be based. The book represents, therefore, in a brief way, an attempt to correlate a laboratory knowledge with the branches of medicine and prophylaxis to which it is most directly applicable."

The revisers of "Hiss and Zinsser" have not only produced a volume which should be in the working library of very pathological laboratory in the country, but they have erected a worthy monument to the memory of Dr. P. H. Hiss, jr., whose untimely death removed from the field of bacteriological research one of its most competent explorers. (W. M. K.)

Ringworm and its Successful Treatment by *J. P. Turner, M. D., medical inspector of public schools, Philadelphia, Pa.* F. A. Davis Co., Philadelphia, Pa., 1921.

A small volume of 62 pages in which the author discusses the pathology diagnosis and a special treatment of ringworm which he has found to be remarkably efficacious in the treatment of infected school children. (W. M. K.)

QUERIES.

To the Editor: I should like to see printed in the Query section of the BULLETIN a few simple, practical tests designed to determine the intelligence of a candidate for enlistment at a recruiting station. Much has been written on this subject, but the tests advocated have not, in my experience, been practical.

EXAMINER.

Coincident with the receipt of the above request by the BULLETIN, a letter regarding some tests of the nature mentioned by "Examiner" was received at the Bureau of Medicine and Surgery from a medical officer who has had much psychiatric experience. This letter was referred for comment to a psychiatrist and to a medical officer who has had much experience in the examination of recruits. Extracts from the letter and the comments upon it may be of assistance to "Examiner," so they are printed below without further remark.

Regarding psychometric tests for use in the recruiting service the following suggestions are submitted. These simple tests are the ones which the feeble-minded usually fail to pass. They are considered adequate for determining the intelligence of an individual, and an applicant for enlistment who fails to pass these tests should be carefully observed by the medical examiner before he is finally accepted for the service.

The tests submitted were selected with the following points in view:

(*a*) Time required for the performance of the tests.

(*b*) Consideration of the generally accepted fact that mental development is rarely completed before the age of 20 and if mental arrest occurs at the age of 12 or less the person is usually feeble-minded.

(*c*) Choice of tests which involve only the simplest reflexes and most elementary mental imagery, requiring the use of "association areas" which are presumably the parts of the brain most deficient in the feeble-minded.

d. Selection of tests which the illiterates of good indigenous mental capacity usually pass, often with high score.

The tests proposed are as follows:

Memory span by digits repeated immediately following their enunciation by the examiner, who should speak in a clear, deliberate manner, allowing time to close the lips after each digit is spoken. A span of five (5) or more digits is required, on a repeated trial as follows,

1–3–9	3–7–2–9	2–5–9–1–3	8–1–9–2–7–3
3–8–5	9–1–3–8	6–9–1–5–8	6–2–8–3–1–9
2–9–6	4–9–2–5	1–5–6–9–2	3–8–5–2–9–4

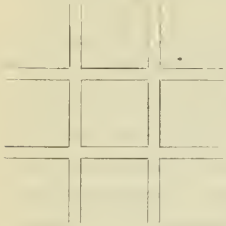
beginning with a series of three (3) digits and increasing the number each third trial until the limit is reached; six digits is the average required.

This test is for retentive memory (auditory), not memory of the remote past. Alcoholism, drug addiction, or organic cerebral disease diminishes the memory

span. Memory is affected by repetitions, continuous or at intervals, by the degree of attention at the moment of learning, and by concentration without distraction.

2. Double cross lines.

Four lines are drawn crossing each other at right angles and numbers are placed in the spaces between them, i. e., a number in each shape or element of the figure produced. This is shown and the component shapes are drawn and numbered. The recruit is allowed to study it until he thinks he has a mental picture of it; the design is then covered, the separate shapes drawn at random and he is required to put in the correct number. If a man required more than one trial at this test, all new problems presented to him would have to be very simple indeed and would require much repetition before he could learn them. Three consecutive failures preclude the probability that a man may learn the things necessary for a sailor to know. (This has been our experience.)



1 4 9 8 etc.

3. Knox cube test.

This test consists of four (4) cubes of wood attached to a base, about 2 inches apart. Two similar blocks are used for tapping. The four cubes are placed before the recruit who is instructed to watch carefully and then tap the same blocks in the same order as tapped by the examiner. Twelve combinations of increasing complexity are used, and assuming that the block at the examiner's right or the recruit's left is numbered, the combinations are as follows:

A	1234	C	1432	G	13124
X	12343	D	1423	H	143124
Y	12342	E	13243	I	132413
B	1324	F	14324	J	142341

This test is used to determine whether a man can follow or carry out orders or instructions as they are given to him. It is a test of visual memory and mental representation. A score of 75 per cent is average, while a score of 50 per cent or less is indicative of feeble-mindedness. Three trials are given and an average of 58 per cent is considered a passing score. Our experience and comparisons by means of statistical methods involving several hundred norms and feeble-minded, indicate that this is one of the most useful tests we employ. With few exceptions, the recruit who makes a high score in this test makes good in the navy.

We think it would be advisable to ask all applicants for enlistment questions similar to the following, touching upon orientation and general information. (Ordinarily the feeble-minded can not answer 80 per cent of them.)

Name the months in proper order. (15 seconds.)

Dates and significance of Christmas, New Year's, July fourth.

Capital of native State. Capital of United States.

Name four large rivers in the United States. Name four larger cities in the United States. Say the A, B, C's. Give the date, days of week, month, and year.

Differentiate King and President. Name the important opposing countries in the World War. Name five Presidents. Who was Columbus, Washington, Pershing, Lincoln?

What is $9\times3=$ $3\times9=$ $5\times7=$ $17-5\frac{1}{2}=$ $9-3\frac{1}{2}=$

A man's salary is $20 per week and he spends $14 each week; how long will it take him to save $300?

Who is President? From what State did he come?

Comment 1.—From the standpoint of a practical recruiter, it is my opinion that the tests suggested by ------ are entirely practicable in so far as the time element is concerned, except at large recruit depots. However, from my observation of the work of the ordinary medical officer on recruiting duty, it is not believed that the tests will be used except in the most perfunctory manner. Furthermore, it is not believed that many medical officers of the service are capable of correctly interpreting the results of the tests since interpretation is preeminently a specialist's field. Again, if a set routine such as the one proposed is carried out in the examination of applicants, it is believed that it will cause friction between the examining medical officer and the recruiting officer, whereas ordinary care in the selection of questions propounded to the recruit during the course of the physical examination will give the examiner a very fair insight into the mentality of the applicant. In other words, if an applicant should be constitutionally inferior (mental), or should be a potential psychiatric patient, and the medical officer should reject him on account of "failing to pass the tests," it is believed that the line officer, not realizing the real object, would object seriously to his rejection. From the foregoing remarks, it will be understood that I am not in favor of an examination such as the one outlined by ------ as a routine measure. In case the examining officer suspects mental inferiority, a set of tests could then be used to confirm his suspicion.

Comment 2.—There is no question regarding the value and usefulness of such tests in the classification of idiots, imbeciles, morons, and subnormals, and it is quite possible that examinations of like character may be used advantageously in the naval service to determine the mental age and degree of intelligence of morons and subnormals who apply for enlistment, taking for granted that imbeciles would be detected without such tests and their acceptance refused.

A recruit presenting himself for examination might, from lack of education, training, or experience, make a total score equivalent of a mental age of 12 or 15, yet have other qualities and be alert enough mentally to make good material for the Navy. On the other hand, a constitutional psychopath might, and usually is, too clever to be tripped by such tests.

A psychopathic individual may be homosexually inclined, or have a very strong "mother attachment," which usually stamps him as a potential psychotic; he can readily score a high percentage in the required psychometric tests, but will soon break down when put under regulations which deprive him of his desires.

As a rule, the recruiting officer has had a somewhat meager education in psychiatry and laboratory psychology, and his usually limited experience in conducting such tests or examinations would necessarily render them less valuable.

I am of the opinion that such tests as outlined, and which could be supplemented by others, viz, differentiation tests, etc., are of value, yet too much importance or dependence should not be ascribed in the selection or rejection of material for the Navy.

On entrance into the service a probationary period of at least two or three months for observation and training should be required in order to determine the recruit's mentality and ascertain his fitness for the service before he is finally or legally accepted. During this probationary period information regarding the recruit's heredity, his proper or maladaptation in school life, his social and economic adjustment, tends to give a clearer picture of the individual and can be depended upon more readily than an elaborate system of psychological tests.

If psychometric tests are adopted they should be used as an auxiliary rather than the principal method of detecting mental inferiority.

THE DIVISION OF PREVENTIVE MEDICINE.

Lieut. Commander R. F. Jones, Medical Corps, United States Navy, in charge.

Notes on Preventive Medicine for Medical Officers, United States Navy.

INSTRUCTIONS TO MEDICAL OFFICERS.

A DISCUSSION OF PREVENTIVE MEDICINE PROBLEMS ABOARD SHIP.

The following extracts, discussing several phases of a medical officer's duties in connection with the prevention and control of disease, are quoted from the annual sanitary report of the U. S. S. *Wyoming* for the year 1921:

SMALLPOX VACCINATION AND TYPHOID PROPHYLAXIS.

Between September 1 and the end of the year all members of the crew whose health records did not contain signed entries of successful vaccination or reaction of immunity were revaccinated and examined at the end of 24 hours, and again after 48 hours if necessary. In all, 1,071 men were vaccinated during this period. Men reporting on board were examined, their health records verified and completed, and the men vaccinated and given typhoid prophylactic unless their health records contained entries which appeared to be reliable.

It is the practice here to send out lists for men who are wanted for inspection. Upon reporting they are formed in line, and each man is given his health record to hold, and as he appears in turn before the medical officer he is required to verify the descriptive sheet; his arm is inspected and the vaccination abstract checked. If vaccination is required, it is performed at once and the date is entered in his health record and also on his index card, which is held in temporary file. The following day the man is again given his health record to present to the medical officer. If he shows an immunity reaction the result is at *once* entered in his health record and signed. At the same time his index card is completed and placed in permanent file. In the case of typhoid prophylaxis, the date of each inoculation is entered on the card and in the health

record at the time given. As soon as the third inoculation has been made the card is placed in permanent file and the health record is signed. Under this system all chance of error is eliminated. There is the further advantage that the man knows that the medical officer has signed the entry. A majority of the men who have been given typhoid prophylactic on board this ship because their health records contained no entries of prophylaxis, claimed they had already received three inoculations during the current enlistment. It is certainly an act of injustice to vaccinate or inoculate a man without signing an entry to that effect.

Results of vaccination.—Of the 1,072 men vaccinated during the above-mentioned period, 1,056 presented satisfactory reactions of immunity within 24 hours. All but 46 of these showed one or more scars indicative of successful primary vaccination, the majority dating from school days, although a few had had their primary takes at a naval training station. All of those successfully vaccinated in childhood had also been vaccinated one or more times after enlistment. Of the 46 who presented no evidence of previous successful vaccination, 28 showed pock marks and gave definite histories of having had smallpox, leaving 18 who had been previously vaccinated one or more times but without a take, from whom a history of smallpox could not be obtained. Sixteen failed to give reactions of immunity. These were tested again with a new lot of fresh virus and the same negative results were obtained. Of these, one presented a pitted scar indicative of a positive take between 6 and 12 months before the test; 7 presented satisfactory evidence of a positive take more than 2 years before the test; 6 had never been successfully vaccinated, and 2 had smallpox in 1914 without successful vaccination prior to that.

The medical journal of the ship shows that prior to September 1 the crew was vaccinated twice during the year, making approximately 3,128 men vaccinated in addition to the figures discussed above, but the results of those vaccinations are not known. There were few of the original crew left on board by September 1.

Unsigned vaccination records not to be trusted.—In a great many instances it has been discovered that stamped and initialed entries relative to cowpox vaccination in the health records of men reporting on board are not to be trusted. In many cases where a positive result of vaccination has been recorded inspection of the man's arm has shown no scar whatever to account for the entry. Doubtless in some of these instances the man really had a reaction of immunity which was mistaken for a positive take, but plain carelessness is probably responsible for the majority of such errors, for in almost an equal number of cases the health record has been found to contain an entry indicating vaccination with a negative result,

whereas the arm showed a pitted scar obviously recent from its coloring, and the man stated positively that the scar resulted from vaccination on or about the date specified in the health record. One must be skeptical when stamped entries for vaccination are initialed by the senior medical officer of a training station, for many errors of both sorts have been discovered on board this ship in health records thus initialed. It is not to be presumed that the senior medical officer personally checks against actual results the health records he thus lightly passes upon.

A word might be said about health records in general: It is clear that all recruiting offices, receiving ships, and training stations have not yet been brought to realize that cruising ships expect to receive correct and complete health records when men are transferred.

OVERCROWDING AND ITS EFFECT UPON HEALTH.

There was comparatively little sickness on board during the summer and autumn months, in spite of serious overcrowding of the ship—overcrowding not only from the viewpoint of public health standards, but also in comparison with the number of men the ship was designed to carry and the original provisions for air supply in living compartments below the gun deck. Toilet and bathing facilities are relatively very much restricted.

For the present large crew there is not sufficient space along passageways in the general vicinity of the canteen, executive office, pay office, barber shop, sick bay, and post office on the starboard side of the gun deck. Commissary stores must also be handled on this side, periodically adding to dense congestion of men. The passageways are no wider on the port side, but there is less congestion, because only the laundry, engineer office, G. S. K. office, ordnance office, and chief petty officers' quarters are located there. The starboard side of the gun deck is quite analogous to "Main Street" in a small town, but the crowding is much more dense, and contact takes place under conditions that are midway between indoor and outdoor conditions. The daily congestion of personnel here at different hours between morning and night is undoubtedly a factor to be taken into consideration in the study of health conditions, for the evils of crowd contact exist to a marked degree, and the danger is always liable to be further increased by the presence of infected men waiting for medical examination or admission to the sick list. First and last, a very considerable exchange of fresh infective matter must take place in these passageways, directly or by means of the "droplet spray," between healthy persons and those already infected or in a carrier state. These conditions are apparently of no importance, or of very little importance, so long as the ship is away from a liberty port or so long as the weather is warm and there is no great preva-

lence of disease ashore. However, they do constitute an epidemiological factor to be reckoned with when the weather is cold and men are congregating below with foci of infection actually on board and with members of the crew constantly introducing fresh virulent strains of the common causative agents of acute respiratory diseases from sources ashore.

It is hardly necessary to remark that communicable diseases of the respiratory type alone are the cause of concern. The sanitary condition of the ship is such as to make possible the successful application of all necessary, specific and general preventive measures against communicable diseases of the intestinal type and against such insect-borne diseases as are likely to be encountered.

This ship is cut up into many small compartments and irregular spaces below the main deck—much more so than battleships of an earlier or later type—due to the fact that she carries six centerline turrets and full broadside batteries, and is equipped as fleet flagship. This is not an unmixed evil, for observation seems to indicate that the crew tends to remain more or less divided into comparatively small groups, with more separation between groups than is the case where large numbers of men are quartered together in one large compartment. Thus, it would seem that these structural conditions tend to interpose definite physical barriers to the spread of infections by nose and throat secretions, and such barriers are especially of value in the presence of overcrowding.

It is believed that the danger of spreading communicable respiratory disease is much greater in the daytime than at night under the conditions which exist on board ship. With reference to ventilation and separation between men while sleeping, conditions are fairly good for the most part, bearing in mind essential service conditions.

From the sanitary viewpoint men sleep in 18 separate or practically separate compartments on the gun deck; in 14 compartments on the berth deck; and, in addition, in numbers of one or two or three in offices, shops, upper platforms in turrets, and in various other places. For the most part separation of men in sleeping quarters is maintained to a satisfactory degree and most of the groups are comparatively small. This increases the factor of safety beyond what might at first thought be expected with so many men on board. Liberal use is made of cots in addition to hammocks, and in certain compartments, which are overcrowded from the standpoint of the usual sanitary standards, this practice, amounting to practically the same thing as billeting men in two-tier standee bunks, is quite acceptable from a practical public-health viewpoint.

Although the ship is overcrowded to the extent that she carries more men than the designed complement, berthing conditions are excellent or good for most members of the crew, inasmuch as all

available space—some of it not regarded as berthing space for the designed complement—is utilized to the best advantage; the exceptions have been noted above. The number of men on board has varied considerably every month. While the weather is warm there is no particular danger from overcrowding, since the main deck is available to a large number of men.

Frequent turnovers of men an epidemiological factor.—The very great turnover of men during the last six months of the year has constituted an epidemiological factor of importance in various ways besides periodically increasing overcrowding. To a considerable extent conditions have been like those at a receiving ship. The personnel has been changing continually. The extent of this turnover is well illustrated by the pay number which represents more than two complete complements for the ship since July 1. The numbers now in use after a period of only six months could serve for a part of a third crew. Large drafts of men have been received from time to time, from training stations and from receiving ships. Health conditions with respect to communicable diseases are always likely to be worse in either of those types of naval organizations than on board cruising ships, and it has been necessary to guard carefully against the introduction and spread of disease. It is a well-known fact that men transferred from receiving ships, and especially from training stations, swell the sick list until a certain proportion of them have been disposed of by discharge from the service, or by transfer to hospital, or until they have become thoroughly adjusted to their environment. The constant receipt of the new men and discharge of old men by special discharge, authorized or directed by the department, has materially interfered with that smoothness of daily work and routine—the efficiency and discipline of a well shaken down crew—that is necessary if the sick list is to be kept low.

ACCIDENTS AND INJURIES.

The accident rate has also been adversely affected by the continual receipt of new men. Lack of training and lack of familiarity with the new job, but especially carelessness, heedlessness, and indifference to danger and safety warnings are the cause of the higher percentage of accidents among new men. Injuries due to accidents have been trivial with a few exceptions, and practically all accidents have been due to carelessness, unnecessary recklessness or stupidity of the injured individual. It has been the practice to post on all bulletin boards immediately after an accident the salient facts relating thereto; the cause, the character and extent of the injury, and a suitable accident-warning headline with a personal appeal to the crew under a statement of local news value. A search for machinery and gear hazards has been made, but it is believed that all reasonable precau-

tions have been taken in these respects to prevent accidents. The entire organization is as anxious to avoid accidents as the medical department.

PHYSICAL AND MENTAL QUALITIES OF ENLISTED PERSONNEL.

The medical officer's observations, which are in accordance with those of division officers who handle the men at work and drill, lead to the conclusion that there has been a definite improvement in the physical and mental qualities of new men reporting on board. The percentage of feeble-minded and dull normal individuals appears to be declining. However, many youths of inferior strength and muscular development are still being received, and in numerous instances the true age is one or two years less than the age stated at the time of enlistment.

Too many men with diseased and enlarged tonsils are still being accepted. Acute tonsillitis is a very frequent disease on board ship and is responsible for a high percentage of lost working days. The majority of all tonsillitis cases as well as the majority of incapacitating cases of other respiratory diseases and middle ear infections occur in individuals of this class.

Men with flat feet and varicocele appear to be no more numerous relatively than before the World War. As usual they build neuroses upon such conditions in a subconscious attempt to escape from facing unpleasant realities in the performance of their duties, or else they consciously use their defects in attempting to shirk or avoid especially unpleasant work such as handling stores or coaling ship. Such cases do not appreciably increase the sick list. As a rule, the physical defect is a minor consideration and inasmuch as the individual often has personality defects—intellectual or emotional—that render him unfit for the naval service, they pass out of the organization more or less promptly via the route of court-martial or undesirable discharge.

Firemen.—It is noteworthy that many of the youths who have had their ratings changed at the training station to that of fireman third class are underweight and have insufficient strength and development to fulfill the requirements of that rating in coal-burning ships. Many of these are intelligent enough and doubtless are qualified for duty in oil-burning vessels. Some of them grow up to the job on board this ship, but often only after one or several short periods on the sick list to permit recuperation from an especially hard watch that has involved energy expenditures beyond their capacities. Some of them can be detailed only as compartment cleaners. It would be helpful if training stations were reminded that recruits of these ratings who are under 145 pounds in weight and who have not yet acquired the requisite muscular development must not be transferred to coal-burning ships.

COMMUNICABLE DISEASES.

During the period from September 1 to the end of the year there was comparatively little communicable disease on board this ship. This was probably due in large part not only to seasonal influences but to the fact that admission rates for communicable diseases of the respiratory type were unusually low during those months at training stations, receiving ships and throughout the Navy generally, as indicated by rates published by the Bureau of Medicine and Surgery, Division of Preventive Medicine. Death rates and incidence rates were likewise low in most of the large cities of the United States well up into December. A large ship is quick to feel the effects of an unusual prevalence of respiratory disease in communities with which the crew comes into direct or even into indirect contact.

The combined figures for acute respiratory diseases on board, by months, during the last quarter of the year furnish a good index of health conditions. This index includes all diseases one or more cases of which occurred, viz, acute follicular tonsillitis, peritonsillar abscess, acute bronchitis, lobar pneumonia, influenza, mumps, and scarlet fever.

The admissions and admission rates per 1,000 per annum by months for those exposed are as follows:

Month.	Chief petty officers.		Marines.		Remainder of crew.	
	Cases.	Rate per 1,000.	Cases.	Rate per 1,000.	Cases.	Rate per 1,000.
October	2	363.6	0	0	17	163.4
November	0	0	0	0	18	171.8
December	3	537.0	4	615.4	38	388.7

The figures are perhaps suggestive of a tendency for both the chief petty officers and the marines to suffer higher attack rates than the rest of the crew, when exposed, although of course the case figures are too small to justify definite conclusions. The rates for the crew are low when it is considered that December was spent at the navy yard, New York, in contact with countless foci of infection there as well as in many other cities visited by men on leave.

GENERAL PREVENTIVE MEASURES.

Without recommendations from the medical officer the ship has been maintained in an excellent state of cleanliness below decks as well as above, and all bedding, including officers' bedding, is thor-

oughly sunned and aired very frequently. A constant effort is made to compel such men as electricians, laundrymen, and storeroom keepers, whose work keeps them below decks a good part of the time, to spend sufficient time in the open air to keep in good physical condition.

Mess gear.—The crew's mess gear is sterilized by boiling after all meals except breakfast Friday morning and Saturday morning. Friday is field day, and it appears necessary that the scullery force devote a few hours each week to cleaning up and getting ready for inspection the following day.

It is probable that little or no danger arises from this omission, because special care is taken to see that the various messmen wash and rinse their mess gear with thoroughness Friday morning. All mess gear is prepared for inspection Saturday morning.

The scullery is kept in a satisfactory sanitary condition at all times. Sterilization of mess gear is regarded as one of the most important general preventive measures employed on board ship. The scullery is woefully inadequate to meet the needs of the ship, both in size and in equipment. There is not quite enough space on the shelves for the convenient stowage of mess gear between meals, and there are but two dish-washing tanks of the dip type with overhead trolley. Consequently, it is out of the question to attempt to wash mess gear in the scullery. All dishes and tableware are washed by messmen at their tables, in dish pans, with hot water and soap drawn from the scullery. When clean, the dishes and silverware are placed in their racks and delivered to the scullery where all racks are immersed in actively boiling water for one minute and a half, drained for a few minutes and placed in their proper spaces on the shelves, ready for issue shortly before the next meal. It is not possible to boil the mess gear longer than one minute when the menu requires the use of bowls, for it takes more than three hours of steady rapid work to pass all racks through the tanks for a dip of 60 seconds each. Fortunately the scullery is near the sick bay and it can be kept under close observation without any particular effort. A member of the Hospital Corps is detailed as sanitary inspector, and it is his duty to visit the scullery two or three times during the process of sterilization after each and every meal, and note the progress and thoroughness of the work. He is required to make a brief note after each meal in a report book which is kept on the medical officer's desk at all times. As a rule, the note is to the effect, "Water boiling well, work satisfactory." It is his duty to report and record accidents or failure to secure steam promptly. In this way immediate steps can be taken in case of difficulty, through the engineer office, to correct the trouble. Such difficulties arise infrequently. As a matter of fact the present force in the scullery understand the sanitary importance

of their work, and as a rule the leading man notifies the medical officer and the chief master-at-arms well in advance when it appears that sufficient steam pressure will not be available.

Attention is invited to the fact that the chief petty officers' pantry and the pantries of all officers' messes are not equipped for sterilization of dishes, glasses, or silverware. This is an important sanitary defect, but correction is not possible in these pantries because of the large number of dishes and glasses that must be handled in a small space. In small messes the danger is not great but in those as large as the wardroom and chief petty officers' messes a real epidemiological factor is involved. A not inconsiderable number of mess attendants use the wardroom dishes as well as the officers.

ERADICATION OF VERMIN.

Cockroaches.—Cockroaches, with which the ship was heavily infested, were quickly reduced to insignificant numbers by the use of 5 per cent cresol in kerosene, applied liberally by painting and wiping and as a spray in pantries, storerooms, galleys, issue rooms, and in all other places where cockroaches were seen. The first lieutenant carried on an active and successful campaign, giving daily attention to all places liable to harbor cockroaches; uncovering all spaces behind lockers, drawers, etc., where they might be in hiding. In addition, powder containing sodium fluoride was suitably placed to effect complete extermination. There are comparatively few cockroaches on board now. Some have been introduced recently with stores.

Bedbugs.—Bedbugs were practically eradicated from all parts of the ship during the autumn by a systematic campaign. The mess attendants' wash room, being of suitable size and capable of being rendered practically air-tight, was rigged as a sterilizing chamber and fitted with a steam nozzle having a long-stem valve which could be operated from outside the room. Mattresses, pillows, and springs were treated in this chamber with live steam under some slight pressure for two hours each. Hens' eggs were placed in different parts of the room. Two eggs were placed inside a mattress which happened to have a rent in its covering. Eggs wre coagulated in all parts of the room, in high and low positions, after two hours' exposure. Those inside the mattress were cooked to a degree equal to that brought about by three minutes boiling in water. A standard method of procedure having been adopted to create enough pressure within the room to bulge the bulkhead plates slightly, but without danger of carrying them away, all mattresses in officers' rooms were given attention. First, the mattress and pillows from the admiral's cabin, chief of staff's room, and flag officers' quarters were sterilized. The ship was not then acting as flagship of the battleship force commander. Next, all wardroom staterooms were thoroughly

disinfected. All mattresses, pillows, and springs were exposed to steam for two hours in the forenoon on a suitable day and dried out in bright sunlight on the upper deck in the afternoon. In the meantime, under adequate supervision, the built-in parts of bunks were thoroughly sprayed and painted with a 5 per cent mixture of cresol and kerosene. It may be remarked at this point that experiments against cockroaches with 2½ per cent cresol and kerosene showed that while they were knocked out immediately and would turn over on their backs, a certain proportion of them would recover after a time. When a cockroach, climbing up a bulkhead or crawling on deck, is hit by the spray of a 5 per cent mixture, sprayed from a point even several feet away, there is no doubt about the lethal effect. This strong solution has caused no particular damage to paint work, fabrics, and other materials, which it has been necessary to spray. The odor is not pleasant, but is not very objectionable to the average person. It wears away in a day or two. After the wardroom quarters, all junior officers' and warrant officers' rooms were likewise treated in succession. After that all sick-bay mattresses and pillows were sterilized. A few days later all mattresses and pillows were taken from the chief petty officers' quarters and steamed. Springs could not be removed from the bunk frames in these quarters and therefore they were gone over carefully with gasoline torches and liquid disinfectant. Inspection showed that many of the life jackets on board harbored bedbugs; these were all sterilized in the steam room and carefully dried in the sun before restowing.

The ship's laundry is constantly watched for bedbugs and from time to time they are found. Every week the laundry is cleaned and live steam from a hose is directed into all cracks and crevices. All woodwork is steamed with special care and the cresol and kerosene mixture is liberally applied. Ship laundries are well understood to act as distributing centers for bedbugs.

Chief petty officers furnish many of the bugs which reach the laundry. Most of the chief petty officers are men of the highest type, yet there are some whose personal habits are no better than those of the worst element among the crew at large. These are a menace to the rest. Bedbugs are brought back to the ship in the clothing from evil resorts, lodging houses, and cheap hotels. It is also well to remember that the most expensive hotels are by no means free from bedbugs. Every stay in port means the arrival of more bedbugs on board, the number being proportionate to the length of stay. In passing, it is interesting to note that bedbugs have been found in mail bags with incoming mail, and in more than one instance in newspapers from newstands. A radical attack upon bedbugs in the chief petty officers' quarters is accompanied by no little

inconvenience to these men. The chief petty officers themselves, to a large extent, must attend to their bunks and effects. It is difficult to clean out the entire compartment in one day, although this is the only way in which complete success can be attained, inasmuch as duties seriously interfere. Some few would rather tolerate the bugs than take the trouble to get rid of them, and the bugs spread rapidly through the compartment on account of the proximity of bunks and clothing lockers. Some men also have the erroneous idea, fixed by many years' service, that it is impossible to get rid of bedbugs. Such men do not cooperate willingly; they do not destroy all bugs in their clothing and lockers; and they are not faithful in the use of the gasoline torch on bunk frames and pipes which harbor eggs. One or two bunks which escape complete disinfection cause the spread of adult bugs to all parts of the compartment within a month, when the weather is warm.

The general crew has not had the privilege of using the laundry. Frequent inspection of the crew's bedding and the questioning of a large number of men leads to the conclusion that there are comparatively few bedbugs among their effects, which are more limited than those of officers and chief petty officers. This is probably due to the fact that bags and hammocks are periodically scrubbed, all clothing is frequently laid out for inspection and hammock mattresses are routinely exposed to bright sunlight for several hours at a time.

A curious mental attitude encountered occasionally among wardroom officers as well as among others is worthy of note. Some few can not seem to get away from the idea, so prevalent in the better class of homes, that it is a disgrace to have bedbugs, and these manifest more or less reluctance in admitting that their rooms are infested. Occasionally, after the detachment of an officer, his relief will immediately report the presence of bedbugs in spite of the fact that his predecessor failed to report them. There is no doubt that a not inconsiderable percentage of men are not all troubled by bedbugs—if they are bitten they are not aware of it, but in a few instances bugs have been known to be present and still are not reported. All officers have been ordered and repeatedly instructed to report the discovery of bedbugs at once to the medical officer and first lieutenant. The great majority of all rooms are free from these pests and it is neither necessary nor desirable to steam mattresses and employ chemical disinfectants periodically in such cases. That the methods employed have been effective is demonstrated by instances in which highly susceptible officers after being bitten have reported the fact and have secured complete relief through one thorough treatment of the room the following morning. In numerous instances of this kind, careful search at intervals for a period of several months has failed to reveal signs of any more bugs.

To summarize: Bedbugs are continually being brought on board ship. To effect their elimination it is necessary constantly to employ economical and practical measures of disinfection not only in staterooms, in and about the bunks, but in wardrobes, drawers, lockers, chair cushionsfi and transom covers; in the laundry and tailor shop, and in life preserver lockers, the post office, first lieutenant's storeroom, crew's library, etc. Occasionally bedbugs are found between the pages of books. The writer does not mean to give the impression that the migratory habits of bedbugs are overlooked, for it is recognized on board that they make their own way about, covering considerable distances at times and traveling from one compartment into another as well as up and down bulkheads in the search for desirable harborage. They have frequently been seen crawling about with considerable speed.

Rats.—The eradication of rats without fumigating the entire ship with hydrocyanic acid gas contitutes a still more difficult problem. A recommendation for fumigation has not been made for the following reasons. There is little or no likelihood that the ship will visit a plague-infected port in the near future; the probability that fumigation even at a United States Public Health Service quarantine station would destroy all rats is not great; rats breed rapidly, and they are continually being brought on board inside the containers of stores and provisions. It is a big undertaking to fumigate a battleship throughout all compartments, many of which can not be broken out for the purpose. The likelihood that one or more men among thirteen hundred would escape detection in spite of due warning and care, only to expose themselves to quick death, must also be taken into consideration, for this happens from time to time in the case of small and easily counted merchant crews. Finally, it is possible by constant effort to keep the rat population on board so reduced in numbers that their destructive efforts are negligible. The difficulty about eradication is that the rat, always a wary animal, seems to develop an especially uncanny intelligence on board ship, probably due to the fact that he lives constantly in the presence of moving men, out of sight but near by. Rats are able to make their way about for the most part overhead on I beams and along piping and electric conduits, and they pass from one compartment to another through wire nettings and small spaces around pipes. They have been seen repeatedly to climb rapidly up smooth metal surfaces and corners, from the deck to the overhead bulkhead. They get into blower compartments and ventilation trunks and build nests in blower casings out of the swift current of air. In one instance investigation showed that a blocked voice tube contained a nest composed of fragments of paper and

cloth which completely obstructed the tube. For the most part, however, they build their nests in places that are accessible once found or suspected.

Trapping has proven entirely unsatisfactory. The rats on board will not enter closed traps and they nearly always avoid spring traps no matter where they are placed. Great care has been used to remove all human odor from the traps by dipping in boiling water, handling carefully and smearing with bacon fat. Bacon rind and cheese have been used as bait. Some little success has been had with a tanglefoot, sticky preparation, sold by the West Disinfectant Co., under the name of "Holdzem." This is smeared on boards; the rats attempt to cross on it, become entangled and can not escape. The price is high and it is estimated that the cost averages about 40 cents per rat caught. At present, experiments are being undertaken to manufacture a substitute preparation on board ship from linseed oil, resin and honey. If this proves satisfactory many rats will doubtless be caught. Up to the present the most successful method of destroying rats has been to corner them and kill them with sticks, and to trace them to their nests and kill the young rats. There are quite a few rats on board at present, but the number is probably not as great as reports from a few compartments would seem to indicate. The same rat is seen in a number of places at different times and is reported as several rats. The storerooms below the berth deck are rat proof when doors are closed. Practically all of them appear to be rat free. The doors are open only for inspection or when men are actively employed in handling stores. Quite a number of rats have been killed by poison in storerooms of the wardroom and junior officers' messes. Poisoning on a large scale has not been attempted yet; poisoning has its defects as well as advantages. A number of rats came aboard in potato crates with the large stock of potatoes taken on board in New York just before sailing for Cuba.

SKIN DISEASES.

In warm weather about 20 per cent of the men who attend sick call present themselves on account of skin diseases. Furunculosis, intertrigo, tinea cruralis, and impetigo contagiosa are common and are important from the standpoint of ship hygiene as well as personal hygiene. Unless adequate sanitary regulations are adhered to in the barber shop these conditions are also spread from that source, and cases of the less common but more severe types of sycosis vulgaris and tinea sycosis are bound to make their appearance from time to time.

Most of the skin diseases seen on board ship are preventable. A lack of personal hygiene is responsible for many cases of such condi-

tions as pompholyx of the feet, interdigital eczemas, diseases of the toenails, and keratoses. All such ailments are seen more frequently in hot weather. As a rule, these foot conditions improve rapidly and disappear under simple treatment when the requisite advice, always given with regard to foot hygiene, is heeded by the patient. Acne and various skin eruptions of intestinal origin are frequently seen but are not of sanitary importance.

Tinea cruralis is very common on board ship. It is highly communicable and is spread by contaminated buckets, towels used in common, and underwear not properly laundered. When buckets are used in common and hot water is not available it is impossible to prevent the spread of infection. Moreover, furunculosis is spread to a certain extent in this way, and multiple boils on the same person not infrequently result from lack of sterilization when the underwear is washed, as well as from lack of personal cleanliness.

With reference to these conditions and also to communicable diseases of the respiratory type, the danger of infection and spread of disease among these large crews of between 1,300 and 1,400 men is magnified out of proportion to the ratio between present battleship crews and the crews of from three hundred to six or seven hundred men in ships of an earlier period, when modern laundry facilities and modern standards of sanitation and hygiene were not thought of or were deemed unnecessary. With increase in the size of groups under conditions of overcrowding, health hazards increase more nearly in geometrical ratio than arithmetically. This is well understood by public health authorities. To keep the incidence of preventable disease low under these conditions, the use of ample supplies of fresh water per capita, better bathing facilities and better laundry facilities are essential, whereas it was possible to get along pretty well without them in an earlier period in the Navy.

The crew of this ship has not had the privilege of sending clothes to the ship's laundry since the writer joined the ship. It would be a valuable measure of prevention if the crew could at least have their underclothing washed and consequently sterilized in the laundry. The laundry is ample in size and equipment for this purpose, and the present laundry force appears to be capable of handling the work without detriment to the clothing of officers and chief petty officers.

A serious sanitary defect exists on board, in that several men must use the same bucket for washing and bathing purposes. There is not sufficient accessible stowage space on board for every man to have his own bucket.

VENEREAL DISEASES.

An effort has been made to see that all members of the crew are aware of the serious complications and after effects that may follow

gonorrhea and syphilis. The pamphlets and circulars prepared in the Bureau of Navigation have been widely distributed, and it is believed that the attitude of the crew—their public opinion, as it were—is more enlightened than was the case among Navy crews in former years. Observation on board ship indicates that the average man has given up the idea that an attack of gonorrhea is no more serious than a cold in the head, and something to be joked about. However, the subject of sexual relations is largely a matter for individuals to settle for themselves; group instruction, posters, and pamphlets probably produce little effect beyond conveying the desired information with regard to the nature and dangers of venereal diseases. They do serve as reminders, and thus probably tend to improve the influence of public opinion on board. Plain speaking on the part of older members of the crew undoubtedly influences a certain percentage of the younger men at least to be careful and avoid some of the more obvious risks of infection. But when all is said and done, the individual adult male develops an opinion for himself about matters sexual. The nature of that opinion depends largely upon early training and the ethical standards observed in the home, and in the home community. The rest of it depends mainly upon environmental influences, accidental associations, and actual experiences during adolescence. By the time the man or boy enters the Navy and is free of home restraints and neighborhood social conventions, which more or less constantly regulate the habits of an individual in his home community, very little can be accomplished by educational measures publicly applied, and no time is afforded by the busy life on board a battleship for intimate personal instruction of a real educational value, except among a small percentage of the men. Of course sound advice is given to those infected; this has some preventive value.

It certainly is not a part of the philosophy of the average adult male in the Navy, or in civil life, to forego sexual intercourse, when opportunity presents and physical attraction impels. Moreover, besides commercial prostitutes and clandestine prostitutes—so-called charity girls—there are in every community many young women, unhampered by social restraints and conventions who feel to an equal degree the promptings of the fundamental sex instinct, and they have the same ideas that the men have about sexual relations; this in spite of the greater social risks taken by the woman and the possibility of becoming pregnant. Therefore, all sorts of relationships are readily formed in the home port, and it is futile to expect that any great percentage of the crew will be restrained either by sound instruction or by logically written and pleasingly illustrated literature, in the glow of the presence of an attractive and appealing member of the opposite sex. Educational methods undoubtedly have their place among administrative measures for the prevention and

control of venereal disease in the Navy because of their beneficial effect upon public opinion within and without the service, and it is possible that from decade to decade they may tend to reduce average incidence rates, but observation on board ship leads to the conclusion that the value of informational measures is not reflected in the fluctuations of current yearly rates. Careful psychological studies have indicated that attempts to trade upon fear of venereal disease, or the consequences thereof, are without value and that it is a mistake to pursue any such course.

In the last analysis the lowering of venereal disease rates on board ship depends principally upon the activities of public health officials, the police, social hygiene workers, and the influential men and women of the community in which liberty is granted. The important activities are those which keep prostitutes out of sight and easy reach, and those which assist the Navy by providing wholesome forms of recreation and opportunity for the men to meet young women of the proper sort with whom they may associate.

When the ship is lying at the New York Navy Yard, during the days immediately following pay day, the crew's telephone is constantly busy with incoming calls from girls who make it their business to know when pay day comes around. The same is known to be true of the several public telephone booths in the New York Naval Hospital for at least three days following pay day. These circumstances are cited merely to show what strong temptations exist to neutralize our educational efforts.

HEALTH CONDITIONS OF THE NAVY.

Health conditions of the Navy have continued to improve during the past month; the annual admission rate for all causes, entire Navy, for the four-week period ending May 6, 1922, was 506 per 1,000. The progressive average rate for the entire Navy is now 670 per 1,000 per annum as compared with 800 per 1,000 per annum for a similar period last year.

Communicable diseases continue to be a small factor in the morbidity rates of the Navy. The annual admission rate for the communicable diseases, exclusive of influenza and venereal disease, for the four-week period ending May 6 was 27 per 1,000.

There have been very few communicable diseases reported from the forces afloat, although the U. S. S. *California* has had quite an epidemic of German measles.

The following table shows the comparison of the rates for April, 1922, and the average for the previous three years.

Annual admission rates per 1,000 for certain communicable diseases, current month of April, 1922, in comparison with the mean annual admission rates, month of April, for the four-year period 1918–1921, inclusive.

	April, 1918–1921.	April, 1922.
Cerebrospinal fever	1.59	0.00
Diptheria	5.26	.38
Influenza	82.30	31.15
Malaria	5.81	19.97
Measles	5.64	1.05
Mumps	26.63	.96
Poliomyelitis	.01	.00
Pneumonia	9.46	2.39
Scarlet fever	3.07	.96
Smallpox	.08	.57
Typhoid fever	.08	.00
Tuberculosis	2.57	3.06

In analyzing this table it will be noted that the morbidity rate for influenza was 31.15 per 1,000 per annum and that for malaria, 19.97 per 1,000 per annum. The vast majority of the admissions for malaria occurred in Haiti and the Dominican Republic. The rate for pneumonia was 2.39 per 1,000 per annum as compared with a previous three-year norm of 9.46.

Health conditions ashore in the United States have been excellent with the exception of malaria, which had a morbidity rate of 14.0 per 1,000 per annum. This high rate for malaria at this season of the year is attributed to Quantico, where there have been 17 admissions with malaria during the past two weeks. No doubt some of these infections occurred in men received from Haiti and the Dominican Republic.

The morbidity rate for the venereal diseases is better than it has been during the past two years, the progressive average now being 112 per 1,000 per annum, as compared with 130 per 1,000 per annum in 1921 and 128 in 1920. During the past four weeks there has been a gradual decline in the venereal disease rate. It is too soon to determine the cause for this decline, but if this condition continues during the next two months it is hoped that the causative factor may be determined.

Health conditions at training stations and other shore stations have been excellent, few communicable diseases being reported except malaria at Quantico.

MORBIDITY RATES FOR THE FORCES AFLOAT, CALENDAR YEAR 1921.

The following rates have been arranged from data contained in the annual sanitary reports from ships for the year 1921:

	Minimum rate.	Median rate.	Mean rate.[1]	Maximum rate.
All causes, diseases and injuries:				
All ships	15.20	379.87	434.87	1,376.07
Battleships and cruisers	128.67	594.98	600.48	1,177.27
Destroyer force	53.33	305.08	355.16	1,376.07
Submarine force	194.44	394.66	392.40	597.40
Gunboats and small cruisers	276.98	609.60	718.10	1,318.84
Miscellaneous vessels	15.20	481.24	521.47	1,373.11
Diseases only:				
All ships	[2] 0	333.33	381.76	1,316.24
Battleships and cruisers	128.67	525.04	542.41	1,136.30
Destroyer force	20.00	269.84	311.66	1,316.24
Submarine force	194.44	347.08	351.20	541.60
Gunboats and small cruisers	242.36	607.84	655.65	1,220.94
Miscellaneous vessels	[2] 0	393.94	447.19	1,225.80
Accidents and injuries:				
All ships	0	40.32	51.31	412.62
Battleships and cruisers	0	58.50	57.89	126.52
Destroyer force	0	32.78	42.17	412.62
Submarine force	0	45.93	39.80	55.50
Gunboats and small cruisers	10.15	54.95	61.89	178.69
Miscellaneous vessels	0	60.99	70.52	280.39
Drownings:				
All ships	0	0	.65	32.26
Battleships and cruisers	0	0	.18	1.91
Destroyer force	0	0	.45	20.83
Submarine force	0	1.34	.76	3.30
Gunboats and small cruisers	0	0	.61	5.07
Miscellaneous vessels	0	0	1.29	32.26
Communicable diseases:[3]				
All ships	0	8.69	18.31	199.87
Battleships and cruisers	0	23.87	33.44	107.10
Destroyer force	0	0	16.46	170.21
Submarine force	0	8.75	8.11	16.32
Gunboats and small cruisers	0	21.50	31.41	135.66
Miscellaneous vessels	0	5.24	14.58	199.87
Influenza:				
All ships	0	0	11.87	351.85
Battleships and cruisers	0	7.56	24.74	214.34
Destroyer force	0	0	10.12	351.85
Submarine force	0	6.12	20.04	82.62
Gunboats and small cruisers	0	9.41	19.85	107.52
Miscellaneous vessels	0	0	9.61	148.76
Venereal diseases:				
All ships	0	107.13	145.07	880.34
Battleships and cruisers	0	135.40	172.87	751.75
Destroyer force	0	87.91	121.58	880.34
Submarine force	47.68	123.42	137.54	252.30
Gunboats and small cruisers	31.80	294.12	293.36	615.37
Miscellaneous vessels	0	130.73	164.56	806.45
Chancroid:				
All ships	0	17.24	36.70	394.69
Battleships and cruisers	0	33.24	49.31	230.09

[1] Average of the rates.
[2] The U. S. S. Pigeon is the only ship that had a rate of 0 for "Diseases only."
[3] Cerebrospinal fever (meningococcus); cerebrospinal meningitis; chickenpox; diphtheria; German measles; malaria; measles; mumps; pneumonia, primary broncho; pneumonia, lobar; scarlet fever; smallpox; tuberculosis, all forms.

	Minimum rate.	Median rate.	Mean rate.	Maximum rate.
Chancroid—Continued.				
Destroyer force	0	9.09	28.14	394.69
Submarine force	0	25.29	36.66	93.80
Gunboats and small cruisers	0	90.89	109.32	241.75
Miscellaneous vessels	0	23.48	38.98	354.84
Gonococcus infection:				
All ships	0	80.00	97.17	581.19
Battleships and cruisers	0	87.27	108.45	373.51
Destroyer force	0	66.60	82.48	581.19
Submarine force	46.15	77.66	89.16	168.90
Gunboats and small cruisers	23.08	151.23	145.29	263.95
Miscellaneous vessels	0	88.79	110.04	417.80
Syphilis:				
All ships	0	3.22	13.17	152.28
Battleships and cruisers	0	8.26	15.24	148.14
Destroyer force	0	0	9.74	111.11
Submarine force	0	11.56	11.69	21.10
Gunboats and small cruisers	0	16.67	38.76	152.28
Miscellaneous vessels	0	8.20	15.94	103.98

In comparing the table published above with those published in Bulletin No. 106, of May 15, 1921, "Notes on Preventive Medicine for Medical Officers, United States Navy," it will be noted that generally the mean rates for the forces afloat are lower for the year 1921 than for 1919 and 1920. However, this is not entirely true for the venereal diseases.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, NAVY YARD, NORFOLK, VA., FOR THE YEAR 1921.

Shortly after the reporting of the undersigned for duty at the navy yard, Norfolk, Mr. Stewart J. Owen, safety engineer of the Atlantic coast, made an inspection of this yard, making certain recommendations, a number of which have been carried out; others are in process of being complied with.

The more one sees of the injuries of deserving men; of the manifest effort of others to base disability claim upon trivial injury; of others to claim occupational disease where in reality there is none; and of still others discharged because of inefficiency, who immediately file a disability claim, the more one realizes the imperative necessity of keeping full as well as accurate records. For example, X came to the dispensary and had some "dust which entered the eye while looking upward" taken out of his conjunctival sac in 1915, and when in 1917 a specific irido-cyclitis necessitated enucleation of an eye, he filed insistent claim for compensation, backed by a letter from a Member of Congress who, no doubt, was misled as to the cause. There was nothing to show injury of any kind. The specialist who enucleated the eye stated that the condition "certainly was not due to injury."

All the data in these cases should be taken fully by a competent stenographer who would not be subject to transfer as is the Hospital Corps personnel. Service exigency has necessitated utilization of the services of three different men on this work during the past six months. They are not stenographers but are fairly good typists. Time is required to learn the forms necessary to be made

out and to get the information concerning a real or alleged injury. It requires skill and experience to question the injured employee. Much of this history taking could be done by a trained competent stenographer on a permanent status. One should be supplied to take charge of and keep the injury files and prepare the records and correspondence concerning these cases.

Working conditions have been improved at places in the yard and especial attention is being paid to the prevention of occupational disease as well as of accident.

On November 26, 1921 the undersigned made the following recommendation:

"From: Medical Officer of the Yard.

"To: Commandant.

"Subject: Safety Precaution and Accident Prevention.

"1. Attached hereto is a rough analysis of the accidents which have occurred in this navy yard between January 1 and November 1, 1921.

"2. The undersigned is unaware of the existence of collated data from which comparisons of results of efforts at accident prevention in navy yards may be made.

"3. It is recommended that—

"(*a*) Uniform methods be adopted for reporting accidents, time lost, and compensation paid.

"(*b*) A trophy be offered to the yard showing highest degree of excellence annually, as expressed by results of safety effort and accident prevention.

"(*c*) A small annual bonus per capita of men supervised be offered to masters, foremen, leading men, and quartermen and that accidents occurring under their supervision be charged against the maximum bonus obtainable by those having supervision.

"At one large plant where the bonus system was in vogue last year:

"'Of the 320 employees eligible to a bonus or additional compensation for safety activities last year, 273 participated in the bonus, and 194 of these 273 were 100 per cent, or had no accidents charged to them for the year. These 194 individuals directed the operations of approximately 3,214 employees, working 10,027,680 hours during the year without a single lost-time accident.'"

Some definite policy should be adopted by navy yards with reference to reporting injuries. The method should be uniform; e. g., the number of days lost during December, 1921, at this yard appears only 131, and that for a very few compensable injuries; yet injuries not so severe as immediately to require complete loss of a given number of days are numerous, come to the dispensary day after day, losing time from work and still the injury may later be made basis for a disability claim. These men, not wholly incapacitated, lose daily one half to an hour in coming, going, and receiving treatment.

From the viewpoint of damage to the Government's interest, it matters little whether the loss of service caused by injury to a workman results in loss of eight hours as a whole day or of eight hours during eight days of treatment.

Actual time lost should be the basis of comparison and not merely time lost by several individuals who have had severe enough injuries to warrant certification of complete incapacity.

A carefully considered estimate of time lost from work station per injured man per day is 45 minutes at a minimum. This includes going to and from the dispensary, treatment, and the necessary taking of data, X ray, etc.

It is believed that the most nearly accurate basis of comparison would be obtained by a "time lost" graph plotted monthly from the following formula:

$$\text{D. L.} + \frac{\text{N} \times \frac{3}{4}}{8} = \text{T. T.}$$

D. L. = Days lost because of complete incapacity.
N. = Total number of treatments.
$\frac{3}{4}$ = Hours per day lost by individual.
8 = Hours in a work day.
T. T. = Total time lost.

For example: In October, 1921, there were 25 days lost because of total incapacity, and 394 dispensary treatments. The formula applied would show:

$$25 + \frac{394 \times \frac{3}{4}}{8} = 25 + 36\tfrac{15}{16} = 61\tfrac{15}{16} \text{ days,}$$

as total time lost of which $36\frac{15}{16}$ days, or over 60 per cent, were lost by persons receiving dispensary treatment, but continuing at work.

Manifestly the reporting of only 40 per cent of the time lost due to injury gives an untrue picture of the whole.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES NAVAL TRAINING STATION, HAMPTON ROADS, VA., FOR THE YEAR 1921.

The average complement of the station for 1921 was 5,708, and for the year 1920, 5,814. However, the last three months of 1920 and the first three months of 1921 represent the time occupied by the peak and the decline of the station complement. In December, 1920, the average complement was 11,909, and in January, 1921, 11,392. The complement gradually diminished through February, March, and April, until it was 5,520 in the latter month, remaining practically at that figure until August.

It was to be expected that the six months from October, 1920, to April, 1921, would represent the period of greatest illness, and this expectation was fulfilled. During the year 1920 the common communicable diseases—mumps, measles, influenza, and tonsilitis—were prevalent throughout the year. In 1921 the high-water mark of those diseases was during the month of January, from which time a rapid decline occurred. The last case of mumps for the year was in June, and the last case of measles was in April. Scarlet fever and diphtheria were present during the first three months of the year, and tonsilities, with 317 cases in January, rapidly declining to 34 in April, with a progressively smaller number each month. Influenza, on the other hand, seems to have increased in the number of cases from January throughout the year. In January, 1920, with a complement of 3,200 men, there were 152 cases of influenza due to a country-wide epidemic which struck this station the latter part of the month, whereas in December of the same year, with a complement of nearly 12,000, there were but 6 cases. In January, 1921, there were 12 cases; then there was a decline lasting until July, when there was a jump to 37 cases, followed by another decline until December, when there were but 14 cases.

In January of this year (1921) an intensive educational campaign of the commissioned and enlisted personnel of the station was instituted in an effort to correct the three cardinal reasons for the dissemination of communicable disease; namely, dirty mess gear, careless habits in drinking of water, and

dissemination of infectious material when coughing and sneezing. The remarkably rapid decline of diseases transmitted by the secretions of the nose and throat during the four epidemic months of the year, with practically the entire disappearance of these diseases in May and the freedom from them during the rest of the year, demonstrates the value of such a campaign and indicates the complete cooperation that has existed between the Medical Department and the administrative authorities of the station.

For a time in February when the incoming detention unit was empty, because recruiting had ceased, we made an experiment to determine the efficacy of the segregation of all those who had come into contact with cases of communicable diseases of any kind and in the following manner: Whenever a case of mumps or measles, scarlet fever or diphtheria was discovered, everyone living in the same bungalow was immediately transfered to living quarters in the incoming detention unit. The bungalows from which they were transferred were thoroughly cleaned and disinfected, and all personal effects of the individuals were also put through a steam chest. The bungalows of the incoming detention unit are arranged so that only 12 men live in a compartment, having their own messing and toilet facilities in that compartment; men, therefore, being amenable to strict segregation. Streets of bungalows were set aside for each of the four diseases mentioned, the idea being that if secondary cases appeared the 12 men affected thereby could be further isolated. At the end of three weeks there were nearly 900 men segregated in the incoming detention unit, among whom not one case of secondary infection was found. This method of procedure interfered materially with the routine of drills and training of recruits, and it was abandoned as useless. After experimenting further along various other lines at efforts of control, in addition to the three factors above mentioned, we finally settled down to the following routine, approved by the commanding officer, whenever any epidemic disease was discovered:

Measles and mumps.—The individual was immediately transferred to the hospital; his effects, and the effects of all contacts living in the same bungalow, were sterilized by steam, and the bungalow scrubbed from top to bottom with a 5 per cent solution of cresol. No segregation of contacts was attempted.

Diphtheria and scarlet fever.—The same procedure as to clothing, bedding, and bungalows was carried out. All diphtheria contacts were cultured, and carriers strictly segregated under guard, with local treatment thrice daily to nose and throat until three consecutive negative cultures were obtained. All scarlet fever contacts were segregated under guard for a period of 10 days.

As a preventive measure to control the spread of communicable diseases, all mess gear is sterilized by steam or by boiling after each meal; the mess gear is then immediately stacked and covered with clean muslin until the next meal; the retained heat drys the mess gear. This sterilization of mess gear is carefully supervised by means of daily inspections carried out by a medical officer assigned for that particular purpose.

To insure all men sleeping head to foot, all billet hooks have been labeled alternately "Head" and "Foot," and men are required to sling their hammocks in accordance with these markings. Inspections are made after taps to see that this order is carried out.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "TEXAS," FOR THE YEAR 1921.

The general health of the officers and crew has been very good, there being no deaths among the commissioned personnel, and only two deaths among the enlisted personnel. During January and February a total of 26 cases of mumps occurred on board, and these cases were confined almost entirely to new recruits received on board from the naval training stations at Mare Island, Calif., and Great Lakes, Ill., just prior to the southern cruise. There was a total of 14 cases of malaria occurring on board. Most of these cases were among new recruits, who were infected prior to joining the ship. In almost every instance the malarial infections were among men enlisted in the Southern States—Arkansas, Tennessee, Mississippi, Alabama, and Louisiana.

There was a total of 161 venereal diseases admitted during the year. Chancroid accounted for 52; gonococcus, 99; and syphilis, 10. Fifty-four cases contracted their infections in Panama or Chile. However, a large number of men were infected in the vicinity of San Pedro, San Francisco, and Bremerton, where these diseases are prevalent. Men who exposed themselves and failed to take the treatment have been punished, and good results have been obtained by enforcing this regulation. Frequent lectures have been given the crew concerning venereal diseases; motion pictures furnished by the "morale division" have been shown; large posters have been placed about the ship; and smaller pamphlets and instructions issued by the department have been distributed, with good results.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "CHARLESTON," FOR THE YEAR 1921.

The first two months of the year 1921 found the U. S. S. *Charleston* rather badly situated as regards health. She had just left the Bremerton Navy Yard where she had been in reduced complement for two years. The *Charleston's* complement was increased from approximately 150 men to 665 in January, 1921. Many of the new men, who were received on board from training stations and receiving ships, were unseasoned and had never been to sea.

At the same time an epidemic of respiratory infection, which for want of a better name was called influenza, was prevailing in the locality of San Diego, Calif. The epidemic occurred during the latter part of January and the first part of February. The symptoms were analogous to those of a "common cold"; with typical malaise, transient fever, and low blood count. Most cases were extremely mild and doubtless many did not even report for treatment.

In all, during January and February only eight cases were admitted for treatment with influenza, but all these were typically mild cases.

The only complications observed, following this epidemic, were middle ear and sinus infections. The germ seemed to have a predilection for the accessory sinuses and also the middle ear. During the latter part of February and the first week of March there were five cases of acute otitis media. None of these cases had been treated for the "influenzalike" infection, but on questioning they gave histories of recent "colds" during which they had been feverish, and had more or less of a general malaise. Free incision of the infected eardrums produced relief. Inquiry among other medical officers and medical men ashore elicited the fact that the same characteristics had been noted elsewhere.

A small epidemic of mumps, originating with a man in a draft from the receiving ship at San Francisco, Calif., early in January, gave rise to 10 additional cases in January and 1 in February.

In this connection I wish to mention the question of tonsillitis, acute follicular. While it is not considered among the communicable diseases, I thoroughly believe that the vast majority of tonsillitis cases in the Navy are not only communicable but preventable. Furthermore, I believe that the admission rate for tonsillitis, acute follicular, eliminating recurrent attacks of acute inflammation in chronically infected tonsils, furnishes the most reliable indicator of the sanitation of a ship, particularly as applied to the sterilization of mess gear and the general serving of food. I have held this view for some time, and in support of it I submit the following: During January, under conditions noted above, there were 22 admissions for tonsillitis, acute follicular, and in view of the fact that the ship had a very adequate scullery with plenty of boiling water at all times I began to feel shaky on the mess gear theory of transmission of disease in sore throat epidemics. After going over all other sources of possible spread of infection, such as proper installation of guards and curved nipples on the scuttle butts, rigid daily inspection of all messmen, who were required to serve food in clean aprons and reasonably clean whites, I returned to the scullery and found that all the mess gear was properly handled except the knives, forks, and spoons, which were not run through the steam chamber because of the fact that the scullery racks were not equipped to hold anything except dishes. This defect was remedied in due course of time with a resultant drop to 10 cases of tonsillitis during February. No other months of the year showed over 5 admissions for tonsillitis, acute follicular; the average for the last 10 months being 2.7 cases per month.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "DENVER." FOR THE YEAR 1921.

When one considers the prolonged tropical duty and the unsanitary conditions that exist in many of the ports visited by this vessel during the year, the health of the personnel has been excellent. No epidemics have occurred, and the few contagious cases have been scattered. On March 10, while returning from Nicaragua, one of the crew developed a severe case of chicken pox. Upon our arrival at Balboa, March 12, the quarantine officer, suspecting that the case might be smallpox, had the man transferred to the quarantine station and placed the ship in quarantine. Everyone on board was revaccinated and the usual measures taken to prevent an outbreak. Two days later, however, the case was diagnosed as chicken pox and the quarantine was lifted.

The percentage of venereal disease was relatively high. In spite of the warnings given and the educational measures employed, there were 2,079 registered exposures during the year. Over half the crew admitted exposure. After visiting Panama and Central America, where venereal disease is so prevalent and prostitution so widespread, it is not surprising that a number of infections occurred.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "ISABEL," FOR THE YEAR 1921.

Probably since there have been naval medical officers, these gentlemen have had cause to be concerned over the incidence of venereal disease when cruising, and this cruise has been no exception. Before leaving Philadelphia all hands

were mustered and a lecture on venereal disease was given. This was also done upon our arrival at the various ports of call, and in every case the moral side of the question was first presented. The advantages of early prophylaxis were explained in detail and figures were quoted to show the number of cases which will follow delayed prophylaxis. As is usual when foreign ports are visited, a certain number of men must try the various alcoholic drinks, and usually when more or less intoxicated fall in with prostitutes, with resultant infections. It has been a great surprise to me to see the indifference shown by so many of this crew to the care of their personal health. Reference to the monthly reports shows that the infections with venereal disease followed long delayed or no prophylaxis.

One reason frequently given when the man has been asked why he neglected prophylaxis is: "I did not know where to get prophylaxis ashore and waited until I got back to the ship." This has been true, for the various languages encountered have been too much for even the American sailor. The writer was on duty in the New York Naval Hospital, in charge of the genito-urinary service, prior to this duty and had ample opportunity to question large numbers of venereal patients, and he is firmly convinced that a sufficient number of cases would be prevented to warrant the Navy supplying, from the ship's canteen, prophylactic packets in a convenient form. This could be done at trivial expense, and by so doing many men would always go on liberty prepared and not have the delay following overnight liberty. A large number of men who have said: "If I had had prophylaxis with me I would have taken it at the time." It must be concluded that it might be worth trying, as other measures seem so disappointing.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "QUIROS," FOR THE YEAR 1921.

As usual on gunboats of the Yangtze River Patrol Force, the venereal diseases caused the highest morbidity rates. Most of the men contracting venereal disease on this ship are first-cruise men. As usual, liquor plays a prominent part as a causative factor. It is believed that prophylactic treatment is taken too late or taken improperly in most of the cases. From a medical point of view it is the opinion of the writer that a prophylactic package similar to that used in the British Navy would be a decided benefit on this station.

Preventive measures have consisted of timely talks, bulletins, and rigid inspections of stores, galley, mess gear, etc. Particular attention is paid to conduct of men while away from the ship on liberty. While epidemics of contagious diseases are nearly always present in all Chinese cities throughout the entire year, no cases have occurred aboard this ship.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, U. S. S. "SCORPION," FOR THE YEAR 1921.

The annual venereal disease rate has been high. This is due, without doubt, to the large number of exposures and to the fact that most of the women of easy virtue in Constantinople have individual rooms so that the men usually stay all night. This, of course, seriously interferes with effective administration of prophylaxis.

Cocaine habitués are attracting particular attention at the present time. The drug is easily procurable, and sailors are easy victims. We are using

every precaution to detect the drug addicts and I have arranged for the transfer of 10 of our personnel to the United States on this account, via the first available Government transportation. This, it is believed, will have a much desired effect upon the remainder of the crew, as this station is very popular and most of the personnel are desirous of completing their enlistments here.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, BRIGADE SURGEON, SECOND BRIGADE, UNITED STATES MARINES, SANTO DOMINGO, DOMINICAN REPUBLIC, FOR THE YEAR 1921.

The general health of the personnel has been very good. The greatest number of admissions in all organizations in Santo Domingo were for malaria, venereal disease, and dengue, in the order named, the annual rates being 244.57, 198.32, and 106.56 per 1,000 per annum. There were a few admissions for tuberculosis, other respiratory diseases, measles, and mumps. Tetanus and small pox were responsible for one admission each. The admission rate for accidents and injuries was 87.32 per 1,000 per annum. There were 19 deaths during the year in the brigade.

As stated in the sanitary report for 1920, it is absolutely impossible to decrease the admissions for malaria, as mosquitoes are prevalent everywhere, and can not be eradicated with the present facilities. However, the personnel at each post are protected as much as possible by being required to sleep under mosquito nets and to take quinine prophylaxis when necessary. Measures are taken at each post to eradicate mosquitoes in the vicinity of the sleeping quarters of the men, but with varying success. Fortunately most of the admissions for this disease were of the benign tertian type. However, there was one death from malignant malaria during the year.

Most of the admissions for dengue occurred during the rainy season. Since mosquitoes can not be eradicated, all that can be done is to carry out prophylactic measures, such as sleeping under mosquito nets and attempting to eradicate mosquitoes in the vicinity of the camp.

There was a decided increase in the number of admissions for the venereal diseases, especially gonococcus infection and chancroid. This increase is not due to any laxity on the part of the medical officers concerned, but is due to two things—the number of prostitutes and the delay in taking prophylaxis. Although prostitution has been abolished by law, clandestine prostitution has increased very much the past year, owing to the fact that the country is at present in very bad financial condition. This forces many native women, who are unable to find employment to engage in clandestine prostitution. Venereal prophylaxis as carried out at present does not, in the opinion of the brigade surgeon, give much protection against venereal disease, as many of the men take venereal prophylaxis too long after coitus for the treatment to be of any value. However, everything possible is being done to lessen the percentage of admissions. Venereal prophylaxis is carried out according to orders, pamphlets are distributed among the men, and it is a brigade order that lectures on venereal disease be given once each week. These lectures are not to be given in a perfunctory manner, but must be made interesting and snappy. When possible, all prostitutes are arrested by the civil authorities, placed in confinement, and treated by the native prison doctor until pronounced cured. However, their methods of treatment are faulty, and it is doubtful if any of these prostitutes are ever cured while in prison.

Smallpox, which swept Haiti last year, began to be epidemic in the Dominican Republic in the spring of 1921, and at present there are thousands of cases in the republic. Fortunately the death rate is not very great, as the disease is mild in type. Owing to the lack of funds in the sanitary department of Santo Domingo at present, and to the indifference and apathy shown by the native sanitary authorities to all matters sanitary, none of these cases can be quarantined, and vaccination can not be carried out thoroughly. It is a common sight at present, in many of the towns in the Dominican Republic, to see natives walking the streets in all stages of the disease. The brigade surgeon is glad to report that there has been only one case of smallpox in the brigade, which speaks very well for the efficiency of vaccination. As many of the enlisted personnel while on liberty, notwithstanding instruction to the contrary, persist in mingling with the natives, sporadic cases of smallpox may be expected to develop in the brigade from time to time, although there is no danger of an epidemic, as all men have been vaccinated at least three times during the year, with a fair percentage of takes. Vaccination will be continued during the year 1922 as necessary.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES MARINE BARRACKS, FIRST AIR SQUADRON, SANTO DOMINGO, DOMINICAN REPUBLIC, FOR THE YEAR 1921.

The health of the command has been excellent for the entire year. At no time has any disease appeared in epidemic proportions. Malaria, dengue, and the venereal diseases have appeared periodically throughout the year. The annual rates of both malaria and dengue would be in excess of those shown in this report were the number of cases transferred to field hospital, Santo Domingo City, Dominican Republic, as "diagnosis undetermined" taken into consideration. However, including these cases, the annual rate would still remain low.

Malaria.—Eradication of mosquitoes, which were so prevalent in this camp in the early spring, has been accomplished by improving drainage, cutting down all grass and weeds, and making a careful daily search for all possible breeding places, with proper prophylactic measures directed against such places when found. At the time of this report mosquitoes are rarely seen in camp and it is believed that this camp can be kept entirely free of these pests for the coming year. The whole command has been carefully instructed as to the prevention and control of malaria. The medical officer in his efforts to eradicate mosquitoes has always received most hearty cooperation from everyone. Men are required to sleep under mosquito nets and regular inspections are made at night to see that this rule is carried out. Men transferred back to camp from hospital are given 10 grains quinine daily for 30 days. It is believed that most cases have been contracted while men were on liberty in Santo Domingo City, for there mosquitoes are much more numerous. All cases have been of the benign tertian type. With conditions in camp so ideal it is expected that a lower annual rate for malaria will be shown for the coming year.

Venereal diseases.—The annual rate for venereal disease, though not high, should be reduced. Most all cases are contracted in Santo Domingo City, where men go on liberty. Prostitution has been abolished by law, but clandestine prostitutes are very numerous. The ease with which men can get alcoholic liquors, and its well-known relationship to the incidence of venereal disease, is believed to be one of the most important factors to be considered.

The men are told repeatedly of every detail of the venereal disease problem and it is believed that some good is done in this way. No doubt, more would be accomplished were liquors made less easily procurable. The native civil authorities are apparently indifferent and make little attempt to aid efforts directed at reduction of venereal disease. Medical prophylaxis is carried out satisfactorily on this station, however, it is noted that too long a time elapses between exposure and treatment. Every man is instructed as to the necessity of obtaining early prophylactic treatment and is repeatedly urged to shorten the time between exposure and prophylaxis.

Smallpox.—Though not appearing on official returns from this station, because the case was sent to field hospital, Santo Domingo City, as "diagnosis undetermined," with symptoms resembling dengue and malaria, one case of smallpox occurred on October 26, 1921. A diagnosis of dengue was made at field hospital on the day of admission and changed four days later to smallpox. A careful investigation of the movements of this man for two weeks prior to the appearance of the disease was made, it being generally known that the patient rarely left the reservation and his post of duty in the recreation hall. Investigation revealed the fact that on the 14th of the month he had been on liberty in Santo Domingo City with two other men from this camp and that the three had stayed in one party the entire time. There was nothing unusual as to places visited while away that would indicate exposure. However, it is a fact that just prior to this time there were several cases of smallpox in the city of Santo Domingo and that two or three thousand cases were present in the Republic, so that contact was possible most anywhere at any time. The two other men who accompanied the patient on liberty did not develop the disease. This camp was immediately quarantined by the brigade surgeon and the medical officer revaccinated every officer and man regardless of previous record, with exception of five whose vaccination results had recently been unquestionably positive. Every precaution was used for the early detection of further cases. Every man was instructed to report to the medical officer if any disability, however slight, developed. Daily inspections of the whole command were made, and every case whose diagnosis was not evident, and who presented any signs or symptoms of smallpox, was immediately placed in isolation tents erected on the leeward side of camp and at a safe distance from the camp. Results of vaccinations were carefully checked; a large number showed immune reaction. Revaccination of the whole command was carried out. The danger of a smallpox epidemic growing out of any particular outbreak is in direct proportion to the percentage of unvaccinated individuals in that particular locality (Da Costa) and it certainly must be true that the men in camp were protected, because of the fact that the man who developed smallpox came in direct contact with a large number of men in camp. An interesting feature is noted in the vaccination record; in red ink, dated 3–4–21, a positive result of cowpox vaccination is recorded and record of one scar. Also another vaccination, 3–9–20, with negative results. Examination of the area does not show any sign of previous vaccination; but the unquestionable positive result recorded 3–4–21 was responsible for the man escaping revaccination by a medical officer at camp where disease appeared. No other cases have developed in two and one-half months.

ABSTRACTS FROM THE ANNUAL SANITARY REPORT, UNITED STATES MARINE BARRACKS, PARRIS ISLAND, S. C., FOR THE YEAR 1921.

The health of the personnel serving at this station has been excellent, due largely to the local climatic conditions. The mild sunny weather which prevails during the wintermonths is directly responsible for the low admission rate for the respiratory infections. This is attributed partly to the fact that the weather itself does not predispose to bronchial and other respiratory disorders, and partly to the fact that on account of the absence of very low temperatures and raw penetrating winds the men are not driven, for the sake of warmth, to crowd themselves into small spaces with the windows and doors all closed, as frequently occurs in colder regions. Thus, much opportunity for the dissemination of disease by the "droplet method" is avoided. The men here are in the open air all day and practically so all night as well, and their appearance shows the beneficial result of such conditions. It is noted in Bulletin No. 105 of the Division of Preventive Medicine that this station has the lowest annual admission rate per 1,000 for all causes of the 12 training stations, camps, and other larger shore stations having a complement of 1,000 or over for the period from January 2 to April 2, 1921, the months in which the greatest amount of sickness is to be expected. The average rate for this station for this period was 387.30 per 1,000 per annum. It is also noted that in the Surgeon General's report the average rate for the entire Navy for the year 1921 was given as 778.99 per 1,000. That the annual rate for a station, used in training green recruits, susceptible to all the ills of this class, should during the worst months of the year be less than half that of the Navy at large as figured for the entire year speaks volumes for the healthfulness of the locality. The main preventive measures employed are those taken against mosquitoes, ridding the post of their breeding places by the usual methods of filling, draining, and cutting away undergrowth, and screening against the insects themselves. Appropriate measures are taken on the appearance of any quarantinable disease.

INSTRUCTIONS TO MEDICAL OFFICERS.

The attention of all medical officers is called to the following general order which, as is stated, was promulgated to prevent the payment of the six months' gratuity to those not entitled to it under the law. This order requires an additional entry to be made on all reports of death.

GENERAL ORDER
No. 82.

NAVY DEPARTMENT,
Washington, D. C., March 1, 1922.

1. It is directed that hereafter a statement shall be made on each death certificate that a court of inquiry, board of inquest or investigation will, or will not, be held, in order to prevent the payment of six months' gratuity to those not entitled to it under the law.

EDWIN DENBY,
Secretary of the Navy.

98046—22——12

Circular letter.
Serial No. 176–1922. WSG/T 132687–0(43).

Department of the Navy,
Bureau of Medicine and Surgery,
Washington, D. C., April 20, 1922.

To: Commandants, navy yards and stations, and Military Governor of Santo Domingo.

Subject: Radio telegraph; pigeons; medical supplies for.

References: (*a*) Letter from engineer officer to commandant, navy yard, Washington, #RTS/pgn, April 10, 1922.
(*b*) Comdt's. 1st end. #4898X April 11, 1922.
(*c*) Bur. of Engineering's 2d end. #618101–1207–W April 18, 1922.

1. The Bureau of Engineering has requested that certain medical supplies be furnished by this bureau for the care of pigeons.

2. Please direct the medical officers of the dispensary or other medical activity under your command to make issues, without charge, to the radio material officer, as further indicated in paragraphs 3 and 4 of this letter; except that it is not considered necessary that the pigeon stations should draw from their maintenance yards when medical stores are more nearly available.

3. The following is an estimate of the approximate quantities required during one year for 50 pigeons, which is the normal complement of most naval pigeon lofts, except at Anacostia, Hampton Roads, Pensacola, and San Diego.

Epsom salts	¼ lb.	Burnt alum	4 oz.
Castor oil	1 pt.	Potassium permanganate	½ lb.
Cod-liver oil	1 pt.	Copper sulphate	4 oz.
Zinc ointment	4 oz.	Boric acid	½ lb.

4. Burnt alum will soon be available for issue at the naval medical supply depot.

5. The following is a list of existing pigeon stations and the maintenance yard of each:

Pigeon station.	Maintenance yard.
Anacostia	Washington.
Newport	Boston.
Coco Solo	Canal Zone.
Dahlgren	Washington.
Great Lakes	Comdt. Ninth Naval District.
Hampton Roads	Norfolk.
Pensacola	Pensacola Air Station.
Quantico	Washington.
Santo Domingo	Military Governor, Santo Domingo.
San Diego	Mare Island.
Pearl Harbor	Pearl Harbor.
Guam	Guam.

Circular letter.
Serial No. 177–1922.

HEH: GA 124842(43).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 20, 1922.

To: All medical and dental officers.
Subject: Revision of Form K Dental.

1. Form K Dental has been revised to the form of a simple statistical report. It is desired that the use of the new forms become effective with the report for the month of July, 1922, at which time the supply of the old Form K Dental remaining on hand will be destroyed.

2. An initial distribution will be made to dental officers.

3. Form K Dental should be submitted monthly, as soon as practicable after the last day of the month, through the medical officer to the Bureau of Medicine and Surgery.

4. Additional supplies of the new Form K Dental may be procured from the Naval Medical Supply Depot, Brooklyn, on Form O as needed.

E. R. STITT.

Circular letter.
Serial No. 178–1922.

No. 124680(43).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 21, 1922.

To: All medical and dental officers.
Subject: Elimination of dental record sheet from health records.

1. The dental record sheet is hereby canceled, as this sheet has been eliminated from the health record now in the hands of the printer. The supply of dental records on hand should be destroyed.

2. No change has been made in the dental abstract, which will be retained as a part of the health record as heretofore.

E. R. STITT.

SDS WHM–HCM 124842(43).

Circular letter.
Serial No. 179–1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 21, 1922.

To: All medical officers.
Subject: Admission to the sick list of personnel of vessels and stations to which no medical officer or hospital corpsman is attached.

1. It is directed that in the future when personnel of ships or stations to which no medical officer or Hospital Corps man is attached are admitted to the sick list and cared for by the medical department of another ship or station, the latter will prepare and forward to the Bureau of Medicine and Surgery a Form F card in every case. On line ten (10) of the Form F card the name of the actual ship or station to which the patient is attached should be inserted, fol

lowed by the name of the forwarding office, e. g., "U. S. S. *Partridge* by Dispensary, Navy Yard, New York."

2. Such cases will not be included on the reports from the forwarding office.

3. Personnel of yard and other craft attached to a navy yard or station will, however, be reported as at present.

E. R. STITT.

WHM–HCM SDS 128586(43).

Circular letter.
Serial No. 180–1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 21, 1922.

To: All navy yards, stations, recruiting stations, marine barracks, and receiving ships.

Subject: Discharge of personnel from the naval service in accordance with approved recommendation of a board of medical survey.

Reference: (*a*) Paragraph 2941, "Manual for the Medical Department, 1917."
(*b*) Paragraph 2284, "Manual for the Medical Department, 1917," under invalided from the service.

1. During the calendar year 1921 seventeen (17) cases were invalided from the service without ever having been admitted to the sick list in accordance with reference (*a*), and one hundred and seventeen (117) cases were invalided from the service without having been readmitted (RA) and discharged as "IS" in accordance with reference (*b*), principally as follows:

Training stations, 7 cases.
Marine barracks, 68 cases.
Marine recruiting stations, 4 cases.
Navy yards, 6 cases (all marines).
Naval stations, 11 cases (9 marines).
Receiving ships, 8 cases.

2. The checking up of such cases entails much time and work in the bureau, all of which would be unnecessary if the provisions of the above references were carried out.

E. R. STITT.

Circular letter. HWS: MFD 129504(44).
Serial No. 181–1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., April 24, 1922.

To: All medical officers.

Subject: Care of the dead, embalming and preparation of remains.

References: (*a*) Article 908, Navy Regulations.
(*b*) Article 1513, Navy Regulations.
(*c*) Article 1841, Navy Regulations.
(*d*) M. & S. circular letter No. SD–129504, June 24, 1918.

1. The bureau's circular letter of June 24, 1918 (reference *d*), is hereby canceled, and care and disposal of the remains of the dead will be governed by the above-mentioned articles of Navy Regulations and the instructions contained in this letter. It is directed that the contents of this letter be communicated to all naval personnel having to do with embalming.

2. It is incumbent on all Navy embalmers to exercise great care in the preservation of bodies, and their preparation for the casket, so that they may reach relatives showing evidence of respectful and careful handling, without signs of decomposition and with the so-called natural appearance retained.

3. Before beginning the injection, complete the shaving and modeling of the features. A liberal application of vaseline will prevent subsequent drying, an important matter in respect to the face and hands.

4. It is not necessary to drain the veins of contained blood, although this is recommended as tending to produce a more pleasing appearance of the body and to lessen the liability to the development of discolored spots and localized collections of gas.

EMBALMING FLUID FORMULA.

Liquid formaldehyde.
(U. S. P. solution of formaldehyde), 13.5 c. c.
Sodium borate (borax), 5 gms.
Glycerin,[1] 5 c. c.
Water, sufficient to make 100 c. c.

5. Should the solution of formaldehyde contain less than 37 per cent of formaldehyde gas, the amount used should be increased proportionately.

6. The solution is irritating to many skins, and some form of protection is advisable. Gloves may be worn in special cases, but in general it will be found more convenient, and equally safe, to anoint the hands prior to beginning work with a heavy protective unguent.

7. The exact composition of an embalming fluid is of less importance than the method of injecting it; but service embalmers, who may be acquainted with civilian practice, and inclined to follow it, should remember that methods which have proved equal to preserving remains for a few days in temperate regions may be entirely inadequate to preserve bodies for months in the Tropics. The fluid represented by the formula quoted (Francis) will retain its stability for more than two and one-half years; it has proved effective in preserving human subjects exposed for two months to a temperature of 98° F., and the property of formaldehyde in acid solution of bleaching muscular tissue to an ashy gray is overcome by the addition of borax, which furnishes the desired alkalinity without causing deterioration of the solution. This formula will be used, therefore, in all cases.

8. The fluid hardens tissues so rapidly that thorough penetration to more remote parts is often hindered. For this reason the whole procedure should be carried out expeditiously, and it is recommended that at each site specified the injection be started with half-strength solution; when the return flow is established, the full-strength solution should then be used as directed in the succeeding paragraphs.

9. The pressure essential to successful injection may be obtained either by elevating the container to a height of about 6 feet, or by means of a bicycle foot pump. The details requiring attention in employing either method will suggest themselves.

10. *Method of embalming.*—The procedure, to be satisfactory, requires both arterial and cavity injection.

11. *Arterial injection.*—The arterial system shall be injected with an amount of the prescribed embalming fluid equal to 15 per cent of the body weight, estimating 450 c. c. of fluid as 1 pound.

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[1] Optional.

Inject each femoral artery toward toes with 2 per cent body weight.

Inject each brachial artery toward fingers with 1 per cent body weight.

Inject one common carotid artery toward head with 2 per cent body weight.

Inject same common carotid artery toward heart with 7 per cent body weight.

Total amount of fluid, including both femorals and both brachials, 15 per cent body weight.

12. The technique of injection is important because prolonged preservation will depend upon saturation of every tissue of the body with embalming fluid. To insure uniform distribution it is usually necessary to make all six injections. The return of fluid through the veins while the extremities are being injected will indicate saturation of the extremities, and the return of fluid during the carotid injection upward will indicate sufficient fluid has been injected into the head and upper extremities.

13. Penetration is promoted by repeated flexion and extension of limbs, and by massage of soft parts. An advancing line of firmness of the tissues may be taken as an indication of the progress of the fluid.

14. It is an easy matter to overinject so that the face and hands are puffy and unnatural. To avoid this, two signs may be accepted as indicating that sufficient fluid has been used, regardless of the actual amount injected, namely, first, if the eyes, lips, or one side of the face become overdistended, or in the case of an extremity, when it is apparent that the fluid has circulated from the smaller arteries through capillaries in the veins; and second, when the tissues of a region are uniformly firm, with no "soft" areas remaining.

15. Overinjection, however, is not objectionable if a long time is to elapse before the remains are to be viewed, since a slow shrinkage of the body usually takes place.

16. When the carotids are being injected, massage of the face and adjacent parts is important, it being especially necessary to make sure that the fluid reaches less vascular parts such as the tip of the nose and margins of the ears. Here, as elsewhere, palpable firmness of the tissues is the indication of successful injection. If any of these parts remain soft after completion of the arterial injection, and show signs of "skin slipping," fluid should be introduced by means of hypodermic syringe, the point of the needle being inserted through the ear, hair line, nostril, or mouth, so that the puncture may be invisible.

17. When, as sometimes happens, it is impossible to attain uniform firmness at the first injection, a second injection undertaken the next day often reaches the soft areas.

18. *Cavity injection.*—Besides injection of the arterial system, cavity injection should be performed, as much additional fluid being used for this purpose as may be required. When circumstances permit delay, it is well to postpone cavity injection until several hours have elapsed after the arterial injection has been completed. By that time, if a second arterial injection is to be required, the necessity for it will be apparent, and it can then be undertaken prior to introducing the breaks in the arterial system entailed by cavity injection.

19. *Thorax.*—By means of aspiration at several points, remove all body fluids and inject each pleural cavity with embalming fluid under moderate pressure until a slight epigastric fullness becomes apparent.

20. *Abdomen.*—By means of aspiration, the point of the needle being extensively moved about, remove as far as possible all gas, liquid intestinal contents, and pathological fluids . Then inject embalming fluid, again moving the needle point about extensively, until slight distention is apparent. Kneading of the abdomen favors diffusion of the fluid.

21. After autopsy bodies are to be embalmed in the same way, but in such cases the cavities of the abdomen, chest, and skull, after complete removal of all viscera, shall be packed with absorbent cotton saturated with embalming fluid.

22. If fluid can not be forced into an artery because of clots or other reasons, such as mutilation or advanced decomposition, multiple injections may be made into the tissues, which should then be wrapped in cotton saturated in embalming fluid. In such case, further, the anus, mouth, and nostrils shall be plugged with cotton soaked in embalming fluid, and the entire body, including the face, ears, and hair, shall be washed with the fluid.

23. *Contagious disease.*—In the case of a body dead of smallpox, plague, Asiatic cholera, typhus fever, diphtheria, or scarlet fever, the remains, after being washed, and after completion of the procedures described, shall be bandaged completely, excepting the head, with muslin soaked in embalming fluid. The hands and face shall be enveloped in a suitable cloth saturated with embalming fluid.

E. R. Stitt.

Circular letter. WJCA: ESK 129733(43).
Serial No. 182–1922.

Department of the Navy,
Bureau of Medicine and Surgery,
Washington, D. C., April 26, 1922.

To: All naval hospitals.
Subject: Occupational therapy for Veterans' Bureau patients.
Reference: Letter from Assistant Director, U. S. Veterans' Bureau to Medical Division, U. S. Veterans' Bureau, dated April 18, 1922.

1. For your information there is quoted herewith the contents of a letter from the Assistant Director of the U. S. Veterans' Bureau under date of April 18, 1922:

"Inasmuch as prevocational training carried on in hospitals, irrespective of its character, is really for the purpose of keeping the patient occupied, or for some special therapeutic effect, all such work should be considered as occupational therapy. Hereafter the term "prevocational training" will not be used in connection with the reconstruction work in hospitals. The term to be used is "Occupational therapy."

Occupational therapy, as so used, will be understood to include all of the courses previously supervised by the Reconstruction Section. It will include all types of training or employment given in hospitals, whether carried out as purely therapeutic measures, or purposely to occupy the time of the patients, or preliminary work toward a vocation."

E. R. Stitt.

Circular letter. WJCA:ESK 129733(33).
Serial No. 183–1922.

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 28 April, 1922.

To: All naval hospitals.
Subject: Re Discharge from hospitals of Veterans' Bureau patients for disciplinary reasons.
References: (*a*) Bureau of Medicine and Surgery circular letter Serial No. 171–1922—129733(33) of March 27, 1922.
(*b*) Letter from the Director, U. S. Veterans' Bureau REH/eus: 10—Hospital Section dated April 26, 1922.

1. In accordance with reference (*b*) you are directed to correct reference (*a*) as follows:

Change the tenth line from the bottom of the first page which reads "confinement to a disciplinary ward and withholding of" to read as follows: "restriction to a ward or wards and withholding of."

E. R. STITT.

Circular Letter.
Serial No. 184–1922. WRJ:THC 132687–0(51).

DEPARTMENT OF THE NAVY,
BUREAU OF MEDICINE AND SURGERY,
Washington, D. C., 2 May, 1922.

To: All naval hospitals (continental limits).
Via: Commandant.
Subject: Occupational therapy for Veterans' Bureau patients.
Reference: Bureau's circular letter No. 129733(43) of April 26, 1922.
Enclosures: (2). Forms #75 and #80, Civil Service Commission.

1. The Navy Department has agreed, at the request of the Veterans' Bureau, to provide personnel, equipment, and material to cover occupational therapy in connection with the hospitalization of U. S. Veterans' Bureau patients.

2. Occupational therapy, in connection with the treatment of Veterans' Bureau patients, will be considered as an integral part of the functions of the hospital in the same manner as the several specialized services are supplied, that is, its surgical service, its medical service, etc. In other words the commanding officer of the hospital will exercise the same control and administer this type of service in the same manner as other departments of the hospital.

3. Requisitions for material for use in connection with this service will be prepared on the regular open-purchase requisition Form No. N. M. S. 1, and submitted to the bureau for approval. Requisitions will conform with all the requirements of article 1607, U. S. Navy Regulations. In the event that only proprietary articles will meet the requirements, the certification required by paragraph 2, subparagraph (L), will be used. It will also be necessary to have an estimated cost on each requisition.

4. A request for an allotment will be submitted by each activity engaged in this service for an amount sufficient to cover such supplies as may be secured on stub requisition from the local supply officer.

5. As the Veterans' Bureau will bear the entire expense incident to this service, and for accounting reasons, it is directed that open-purchase requisitions and stub requisitions bear the following notation:

"The above equipment and material is required for use in connection with providing occupational therapy for Veterans' Bureau patients in naval hospitals."

6. An accurate inventory of all nonexpendable material used in this service will be prepared and maintained thereafter as a separate inventory of material under the cognizance of the Veterans' Bureau. The title to all material used in occupational thereapy will remain vested in the U. S. Veterans' Bureau, and will be subject to disposition by that bureau when this work is discontinued.

7. Permission has been obtained from the Secretary of the Navy for the establishment at navy hospitals of the following positions:

Rating.	Pay.
Head physiotherapy aide	$166.66 per month.
Physiotherapy aide	142.50 per month.
Occupational therapy aide	133.33 to 150 per month.
Teacher (academic and commercial)	133.33 to 150 per month.
Educational director	200 per month.

8. Requests for personnel of this character will be submitted to the bureau as the needs develops, specifying the rating, proposed rate of pay, and, in the case of occupational therapy aides and teachers, the subject or course to be covered. Authority will then be granted for appointment from the lists of eligibles on file at the office of the district secretary of the Civil Service Commission. The appointments will be made in the same manner as are those in the clerical service of the Naval Establishment, and these enrployees will be subject to the same rules and regulations as regards hours of employment, pay, leave, retirement, etc., as are other employees of the classified service.

9. It is believed that appointment of physiotherapy aides from civil life will not be necessary, but that treatment of this character can be administered by members of the Hospital Corps and Nurse Corps now being trained. However, as above noted, the positions have been authorized and can be utilized if required.

10. Your attention is invited to the fact that the term "occupational therapy" as used in connection with the treatment of Veterans' Bureau patients does not include physiotherapy or hydrotherapy (reference). It is the policy of the bureau to provide physiotherapy and hydrotherapy for the common use of naval and Veterans' Bureau patients, the cost of such service to be prorated between the services.

11. The inclosed announcements of the Civil Service Commission, setting forth the requirements for appointment to these positions, are forwarded for your information. The position of occupational therapy aide will be filled from the register of "Reconstruction aide (Form No. 75); the positions or teacher and educational director will be filled from the register of "Teachers" and "Rehabilitation assistant" (Form No. 80).

E. R. Stitt.

Circular letter.
Serial No. 185–1922.

WJCA: ESK 129733(43).

Department of the Navy,
Bureau of Medicine and Surgery,
Washington, D. C., 6 May 1922.

To: All naval hospitals.
Subject: Occupational therapy in U. S. naval hospitals.
References: (*a*) Letter from Director, U. S. Veterans' Bureau, MCG/jat; 10 of March 21, 1922.
(*b*) Bureau of Medicine and Surgery circular letter Serial No. 182–1922—129733(43) of 26 April 1922.

1. In compliance with the request of the Director of the U. S. Veterans Bureau as expressed in reference (*a*), the Bureau of Medicine and Surgery has

completed arrangements whereby all personnel, equipment, and material to cover occupational therapy (reference (*b*) and physiotherapy for Veterans' Bureau patients in naval hospitals will, in the future, be provided by this bureau.

2. In order to simplify the rendition of necessary expense accounts for this work to the U. S. Veterans' Bureau for reimbursement, it has been decided that only Veterans' Bureau patients will be permitted to take advantage of occupational therapy (reference (*b*) provided by the civilian personnel referred to in paragraph 1. Occupational therapy for naval personnel will be furnished by the Red Cross and in no instance will naval personnel receive instruction from the civilian occupational therapy teachers supplied for Veterans' Bureau patients.

3. In view of the proposed plan to utilize naval and not civilian personnel for physiotherapy work in naval hospitals, no distinction will be made between naval and Veterans' Bureau personnel in so far as physiotherapy is concerned.

E. R. STITT.

VITAL STATISTICS.

The "Monthly Health Index," which is published on the 15th of each month, contains the statistical data for individual ships and shore stations. The statistics appearing in this BULLETIN are summaries compiled from those published in the "Monthly Health Index."

Annual rates, shown in the succeeding statistical table, are obtained as follows:

The total number of admissions to the sick list or the number of deaths reported during the period indicated is multiplied by $\frac{3\,6\,5}{2\,8}$ or $\frac{3\,6\,5}{3\,5}$ or 12, depending upon whether the period includes four or five weeks or a calendar month. The product is then multiplied by 1,000 and divided by the average complement.

E. R. STITT.

TABLE No. 1.—*Monthly report of morbidity in United States Navy and Marine Corps for the month of April, 1922.*

	Entire Navy.	Forces afloat.	Atlantic Fleet.	Pacific Fleet.	Shore stations.	Atlantic seaboard stations.[1]	Pacific seaboard stations.	Marine Corps.
Average complement.....	125,585	89,706	38,937	37,804	35,879	21,737	7,142	21,828
All causes:								
Number of admissions....	4,908	2,378	885	822	1,530	1,143	270	1,042
Annual rate per 1,000.....	468.96	318.11	272.75	260.92	511.71	630.99	453.65	620.57
Diseases only:								
Number of admissions ...	3,384	2,312	748	722	.....	.....	.....	923
Annual rate per 1,000.....	323.34	309.28	230.53	229.18	.....	.....	.....	549.70
Accidents and injuries:								
Number of admissions ...	634	364	137	96	270	.....	.....	119
Annual rate per 1,000.....	60.58	48.69	42.22	30.47	90.30	.....	.....	70.87
Communicable diseases, exclusive of venereal disease:..								
Number of admissions ...	723	289	.....	.....	221	112	28	178
Annual rate per 1,000.....	69.08	38.66	.....	.....	73.91	61.83	47.05	106.01
Venereal disease:								
Number of admissions ...	1,121	714	183	120	407	278	89	205
Annual rate per 1,000.....	107.11	95.51	56.40	38.09	136.12	153.47	149.54	122.09

[1] Does not include eighth and ninth naval districts.

NOTE.—Asiatic and unassigned ships not reported. Marine Corps included in forces ashore and afloat.

TABLE No. 2.—*Number of admissions reported by form F cards for certain diseases and annual rates per 1,000 for the month of April, 1922.*

	Forces afloat, Navy and marines.		Forces ashore, Navy and marines.		Total.	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases	2,312	290.60	2,439	1,013.45	4,751	453.96
Injuries	364	45.17	270	112.19	634	60.58
Total admissions	2,676	332.04	2,709	1,125.64	5,385	514.54
Class III:						
Appendicitis, acute	33	4.09	35	14.54	68	6.50
Autointoxication, intestinal	8	.99	26	10.80	34	3.25
Cholanditis, acute	22	2.73	16	6.65	38	3.63
Cholexystitis, acute	2	.25	4	1.66	6	.57
Cholelithiasis	0	0	2	.83	2	.19
Colitis, acute	0	0	4	1.66	4	.38
Constipation	21	2.61	24	9.97	45	4.30
Enteritis, acute	23	2.15	13	5.40	36	3.44
Gastritis, acute catarrhal	6	.74	10	4.16	16	1.53
Gastroenteritis	23	2.85	35	14.54	58	5.54
Hemorrhoids	26	3.23	27	11.22	53	5.06
Pharyngitis, acute	19	2.36	14	5.82	33	3.15
Ulcers	1	.12	1	.42	2	.19
Total	184	22.83	211	87.67	395	37.74
Class VII:						
Varicocele	9	1.13	11	4.56	20	1.91
Class VIII:						
Chicken pox	1	.12	2	.83	3	.29
Diphtheria	0	.....	4	1.66	4	.38
German measles	39	4.84	4	1.66	43	4.11
Influenza	194	24.07	132	54.85	326	31.15
Measles	8	.99	3	1.25	11	1.05
Mumps	7	.87	3	1.25	10	.96
Pneumonia, broncho	3	.37	6	2.49	9	.86
Pneumonia, lobar	7	.87	9	3.74	16	1.53
Scarlet fever	2	.25	8	3.32	10	.96
Smallpox	0	.....	6	2.49	6	.57
Total	261	32.38	177	73.55	438	41.85
Class IX:						
Dysentery, entamebic	0	.....	4	1.66	4	.38
Class X:						
Dengue	2	.25	37	15.37	39	3.73
Filariasis	0	.....	1	.42	1	.10
Malaria	16	1.99	193	80.20	209	19.97
Total	18	2.23	231	95.99	249	28.79
Class XI:						
Tuberculosis (all forms)	10	1.24	22	9.14	32	3.06
Class XII:						
Chancroid	172	21.34	75	31.16	247	23.60
Gonococcus infection	467	57.95	244	101.39	711	67.94
Syphilis	75	9.31	88	36.57	163	15.57
Total	714	88.59	407	169.12	1,121	107.11
Class XVIII:						
Bronchitis, acute	167	20.72	146	60.67	313	29.91
Laryngitis, acute	2	.25	11	4.57	13	1.24
Pleurisy, acute fibrinous	1	.12	2	.83	3	.29
Rhinitis, acute	33	4.09	10	4.16	43	4.11
Tonsillitis, acute, follicular	217	26.93	203	84.35	420	40.13
Total	420	52.11	372	154.57	792	75.68
Class XX:						
Hernia	29	3.60	16	6.65	45	4.30

TABLE No. 3.—*Number of admissions reported by Form F cards and annual rates per 1,000, entire Navy, for the 4-week period April 2–29, 1922, inclusive.*

	Navy (complement, 103,757).		Marine Corps (complement, 21,828).		Total (complement, 125,585).	
	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.	Number of admissions.	Annual rate per 1,000.
Diseases of the circulatory system	17	2.13	7	4.17	24	2.48
Diseases of digestive system	458	57.38	100	59.56	558	57.76
Diseases of ductless glands and spleen	2	.25	0	0	2	.21
Diseases of ear	83	10.40	15	8.93	98	10.14
Diseases of eye and adnexa	71	8.90	12	7.15	83	8.59
Diseases of genito-urinary system (non-venereal)	140	17.54	19	11.32	159	16.46
Communicable diseases transmissible by oral and nasal discharges	354	44.35	60	35.73	414	42.85
Communicable diseases transmissible by intestinal discharges	2	.25	3	1.79	5	.52
Communicable diseases transmissible by insects and other arthropods	37	4.64	106	63.13	143	14.80
Tuberculosis (all forms)	21	2.63	9	5.36	30	3.11
Venereal diseases	803	100.61	205	122.09	1,008	104.34
Other diseases of infective type	214	26.81	72	42.88	286	29.60
Diseases of lymphatic system	56	7.02	16	9.53	72	7.45
Diseases of mind	14	1.75	11	6.55	25	2.59
Diseases of motor system	53	6.64	26	15.48	79	8.18
Diseases of nervous system	28	3.51	14	8.34	42	4.35
Diseases of respiratory system	792	99.23	153	91.12	945	97.82
Diseases of skin, hair, and nails	75	9.40	27	16.08	102	10.56
Hernia	38	4.76	6	3.57	44	4.55
Miscellaneous diseases and condition	56	7.02	25	14.89	81	8.38
Parasites (fungi and certain animal parasites)	61	7.64	35	20.84	96	9.94
Tumors	9	1.13	2	1.19	11	1.14
Injuries	466	58.39	110	65.51	576	59.62
Poisons	16	2.00	9	5.36	25	2.59
Total	3,866	484.37	1,042	620.57	4,908	508.03

TABLE No. 4.—*Summary of annual admission rates for venereal disease reported from ships for March, and from various shore stations for the 4-week period April 2 to April 29, 1922, inclusive.*

	Annual rate per 1,000, April.			Average rate since Jan. 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All ships	0	107.49	1,136.84	0	129.24	1,028.57
Battleship and cruiser force:						
Atlantic Fleet	0	84.90	363.63	0	105.05	367.81
Pacific Fleet	63.82	120.48	205.51	68.22	105.85	157.71
Asiatic Fleet	(1)	(1)	(1)	112.50	215.08	346.34
Destroyer force:						
Atlantic Fleet	0	110.06	679.24	0	148.41	722.89
Pacific Fleet	0	97.59	842.10	0	101.77	566.95
Asiatic Fleet	123.71	127.20	134.83	0	309.55	1,028.57
Miscellaneous:						
Atlantic Fleet	0	114.14	1,136.84	0	130.80	568.42
Pacific Fleet	0	63.01	1,000.00	0	76.71	347.82
Asiatic Fleet	0	491.22	705.88	0	350.72	1,000.00
Unassigned, including ships on special duty	0	153.77	757.89	0	154.73	642.85

TABLE NO. 4.—*Summary of annual admission rates for venereal disease reported from ships for March, and from various shore stations for the 4-week period April 2 to April 29, 1922, inclusive.*—Continued.

	Annual rate per 1,000, Apr. 2-29, 1922.			Average rate since Jan. 1, 1922.		
	Minimum rate.	Mean rate.	Maximum rate.	Minimum rate.	Mean rate.	Maximum rate.
All naval districts in the United States	0	70.16	294.81	0	91.36	340.00
First naval district	0	12.67	62.50	11.58	39.25	166.66
Third naval district	0	29.88	88.43	5.32	63.48	125.44
Fourth naval district	0	223.88	294.81	0	229.02	254.71
Fifth naval district	0	91.55	243.82	29.62	120.68	217.38
Sixth naval district	33.33	32.21	45.61	38.50	48.92	131.81
Seventh naval district	0	0	0	24.75	24.75	24.75
Eighth naval district	63.41	81.85	86.86	105.00	141.21	340.00
Ninth naval district	25.97	25.97	25.97	72.87	72.87	72.87
Eleventh naval district	25.69	26.93	33.76	11.03	26.96	45.89
Twelfth naval district	35.91	93.96	196.80	58.08	118.89	127.29
Thirteenth naval district	0	30.18	99.99	19.10	46.77	110.08

RATIO OF GONOCOCCUS AND SYPHILIS INFECTION TO TOTAL CASES OF VENEREAL DISEASE.

	Per cent, March.		Per cent since Jan. 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All ships	69.23	11.09	66.69	11.16
Battleship and cruiser force:				
Atlantic Fleet	64.86	21.62	69.64	11.78
Pacific Fleet	82.40	9.6	80.48	11.78
Asiatic Fleet	(1)	(1)	66.03	22.64
Destroyer force:				
Atlantic Fleet	61.90	6.66	63.42	6.65
Pacific Fleet	78.08	6.84	75.87	7.45
Asiatic Fleet	33.33	33.33	48.52	13.23
Miscellaneous:				
Atlantic Fleet	55.84	14.28	64.05	13.87
Pacific Fleet	93.54	6.45	81.74	7.93
Asiatic Fleet	42.85	28.57	45.56	18.35
Unassigned, including ships on special duty	61.40	7.01	58.23	11.17

	Per cent, Apr. 2-29, 1922.		Per cent since Jan. 1, 1922.	
	Gonococcus.	Syphilis.	Gonococcus.	Syphilis.
All naval districts in the United States	69.93	19.01	67.44	16.86
First naval district	0	100.00	78.04	14.63
Third naval district	62.50	12.50	63.38	21.76
Fourth naval district	87.50	0	79.03	4.03
Fifth naval district	67.53	20.78	62.23	15.10
Sixth naval district	50.00	33.33	75.00	16.66
Seventh naval district	0	0	100.00	0
Eighth naval district	40.00	60.00	68.88	26.66
Ninth naval district	100.00	0	76.66	16.66
Eleventh naval district	100.00	0	72.22	16.66
Twelfth naval district	70.83	20.83	61.45	30.20
Thirteenth naval district	50.00	50.00	84.61	15.30

[1] No report.

TABLE No. 5.—*Deaths reported, entire Navy, for the 4-week period, April 2–29, 1922, inclusive.*

	Navy (complement 103,757).	Marine Corps (complement 21,828).	Total (complement 125,585).
Influenza-pneumonia	1	0	1
Pneumonia, broncho	1	0	1
Pneumonia, lobar	1	0	1
Tuberculosis, chronic pulmonary	1	0	1
Measles	0	1	1
Dysentery, entamebic	1	0	1
Syphilis	1	0	1
Other diseases	5	1	6
Drowning	6	2	8
Other accidents and injuries	3	3	6
Poisons	3	0	3
Total	23	7	30
Annual death rate per 1,000, all causes	2.88	4.17	3.11
Annual death rate per 1,000, diseases only	1.38	1.19	1.35

INDEX TO UNITED STATES NAVAL MEDICAL BULLETIN.

VOLUME XVI.

INDEX TO SUBJECTS.

[Articles not appearing in full in the BULLETIN are marked (ab).]

Absorption of local anesthetics through the genito-urinary organs (ab) .. 105
Accessory sinus blindness (ab) 338

Abdominal syphilis (ab) 516
Absorption of local anesthetics through the genito-urinary organs (ab) 105
Accessory sinus blindness (ab) .. 338
Accidents of ships 368
Acute infectious conjunctivitis .. 143
Acute ulcerative gingivitis, practical treatment of 883
Adrenaline by chloroform, modification of action of (ab) 104
Afebrile quartan malaria with urticaria (ab) 324
Albumin, lymphocytic cells and tubercle bacilli in sputum (ab) 104
Alcohol question in Sweden 649
Amebic dysentery and amebiasis, bismuth-emetine treatment for (ab) 725
American Academy of ophthalmology and oto-laryngology, meeting of 341
American College of Surgeons, hospital standardization program of the 293
American Dietetic Association, meeting of 341
Ammonia content of the blood and its bearing on the mechanism of acid neutralization in the animal organism (ab) .. 735
Amœbic dysentery, treatment of .....
Anatomical School at Padua .. 1015
Acidosis in operative surgery (ab) 103
Acquisition of useless knowledge 877
Actinomycosis 144
Acute bacillary dysentery (ab) .. 325
Anchylostomiasis 144
Anemia, pernicious (ab) 78
Anesthesia in America, history of 461
Anesthetic and convulsant effects of gasoline vapors (ab) .. 105
Annual health report of the German Navy 558
Anthelmintics and hookworm treatment (ab) 1064
Anthrax 145
Antiketogenesis (ab) 331
Antimony tartrate, intravenous injection of, in bilharzia disease (ab) 526
Antipyrene, relation of dextrose of blood to (ab) 109
Antiscorbutic action of raw potato (ab) 101
Antiscorbutic vitamine, effect of heat and oxidation upon the (ab) 331
Antiscorbutic vitamines contained in dehydrated fruits .. 1082
Antispasmodic drugs on the bronchus, study of (ab) 1062
Army method of handling syphilis 345
Arsphenamin in nonsyphilitic diseases, use of (ab) 520

	Page.
Arsphenamin, prophylaxis of syphilis with (ab)	520
Arsphenamin, silver, therapeutic index of	1081
Ascaris larvæ, course of migration of (ab)	97
Atrophic rhinitis, use of scarlet red emulsion in (ab)	337
Aviation medicine in the United States Navy	834, 983
Bacillary dysentery, acute (ab)	325
Balantidium coli and pernicious anemia (ab)	727
Basal metabolism, determination of, from the carbon-dioxide elimination (ab)	530
Benzoate, benzyl	115
Benzyl benzoate	115
Benzyl esters, pharmacology of (ab)	108
Beriberi and related diseases, nature of	1063
Bile ducts and gall bladder, operation on (ab)	899
Bilharzia diseases, intravenous injection of antimony tartrate in (ab)	526
Bilharzia diseases treated with tartar emetic (ab)	733
Bilharziasis, vesical (ab)	1062
Biliary obstruction required to produce jaundice (ab)	1063
Biliary tract, nonsurgical drainage of (ab)	94
Biology of the Danish Culicidæ, contributions to the (ab)	730
Bismuth-emetine treatment for ambeic dysentery and amebiasis (ab)	725
Blindness, accessory sinus (ab)	338
Blood pressure, causes and treatment of high (ab)	72
Blood qualities, hereditary (ab)	895
Blood transfusion, history of	465
Body Louse and the Three Horsemen	713
Bone repair, Factors in (ab)	897
Book notices	131, 355, 569, 763, 929, 1103
Botulism (ab)	102
Bronchus, right lower, foreign body in	506
Bronchopneumonia, and bronchostenosis following appendectomy	57
Bronchostenosis and bronchopneumonia following appendectomy	57
Bronchus, study of antispasmodic drugs on the (ab)	1062
Bunion, "Hallux Valgus" operations, using Mayo's technique, report of three	291
Caffeine, ethlyalcohol, nicotine on the behavior of rats in a maze (ab)	1063
Calcium assimilation, comparative influence of green and dried plant tissue, cabbage, orange juice, and cod-liver oil on (ab)	333
Calomel ointment, compound notes concerning	604
Cancer of the tongue (ab)	901
Carbon-dioxide elimination, determination of the basal metabolism from the (ab)	530
Carbon monoxide asphyxia	1029
Carbon monoxide asphyxia, respiration and blood alkali during (ab)	330
Carbon tetrachlorid for removal of hookworms (ab)	1053
Care of sick and wounded of the North Russia Expeditionary Force	744
Causes and treatment of high blood pressure (ab)	72
Cerebrospinal fluid, protein in (ab)	102
Cebrospinal meningitis	147
Charcot-Leyden crystals in stools as aid to diagnosis of entamoebic dysentery (ab)	904
Chaulmoogra oil derivatives, curative effects of on leprosy	910
Chaulmoogra oil in tuberculosis	118
Chemical warfare	1071
Chemistry	100, 329, 530, 735, 1062
Chemotherapy (ab)	1064
Cholecystitis, chronic	63
Cholelithiasis	25
Cholemia, nitrous oxide and (ab)	104

Page.
Chloride metabolism (ab) 106
Chlorine antiseptics in dogs, toxic effects of (ab) 109
Chronic cholecystitis 63
Chronic nephritis (ab) 83
Clift, William, Diary of 1078
Clinical notes 57, 285, 483, 717, 881
Colloidal gold solution used at the United States Naval Medical School, method of preparing 1037
Communicable diseases, control of 141
Communicable diseases of ship- 365
Comparative influence of green and dried plant tissue, cabbage, orange juice, and cod-liver oil on calcium assimilation (ab) 333
Composition of urine in man, effect of hydrochloric acid ingestion upon (ab) 539
Compound calomel ointment, notes concerning 604
Conjunctivitis, acute infectious- 143
Conservation of gauze, on the 880
Convulsant and anesthetic effects of gasoline vapors (ab)- 105
Course of instruction for nurses-
Course of migration of Ascaris larvæ (ab) 97
Creatinine and parathyroids (ab) 334
Curative effects of chaulmoogra oil derivatives on leprosy 910
Danish culicidæ, contributions to the biology of (ab) 730
Death by drowning, method for determination of (ab) 891
Dengue 150
Dermatitis venenata produced by an irritant present in stem sap of the mango 904
Detection of Lambia intestinalis by means of duodenal tube (ab) 726
Dextrose of blood to antipyrine, relation of (ab) 109
Dhobie itch produced by inoculating a culture of Epidermophyton rubrum (ab) 906
Diabetes, experimental studies in (ab) 100, 101

Page.
Diabetes insipidus, pituitary extract and histamine in (ab)- 102
Diabetes mellitus 561
Diagnosis and treatment of syphilis 1011
Diagnostic sign differentiating between eruptions caused by cowpox vaccination and those due to smallpox and chicken pox 290
Dietetics and food, what nurses need to know about 919
Differential diagnosis of the common intestinal amebæ of man (ab) 728
Digest of decisions 125, 353, 467, 759, 923, 1099
Diphtheria 151
Diphtheria carriers and their treatment with mercurochrome (ab) 891
Diphtheria on the U. S. S. *New Mexico*, report of an outbreak of 775
Diphtheria, predisposing factor in (ab) 81
Diphtheria toxin-antitoxin mixture, immunization of adults with 907
Dirigible ZR–2, destruction of 1074
Dispersion of flies by flight 739
Dissemination of spirocheta pallida from the primary focus of infection (ab) 516
Distinctions and honors 51
Disturbances in the development of mammalian embryos caused by radium emanation (ab) 735
Dominican Republic, public health in (ab) 733
Drainage, methods of 913
Drug addiction as given in the destroyer squadrons, United States Pacific Fleet, lectures on 593
Drug addiction disease, Lipoids in treatment of (ab) 104
Drugs, value of 352
Dysentery (ab) 902, 903, 1055
Dysentery, acute bacillary (ab)- 325
Dysentery, amebic 152
Dysentery, amebic, treatment of 1083

Page.

Dysentery, bacillary ---------- 153
Ear, nose, and throat requirements of airmen (ab)------- 1065
Editorial---------- 43, 280, 477, 713, 877, 1029
Effect of heat and oxidation upon the antiscorbutic vitamine (ab) ---------- 331
Effect of muscular exercise upon certain common blood constituents (ab)---------- 333
Elements of leadership------ 251, 433
Endocrine glands, on the------- 821
Entamœbic dysentery, Charcot-Leyden crystals in stools as aid to the diagnosis of (ab)-- 904
Epidermophyton rubrum, Dhobie itch produced by inoculating a culture of (ab)------ 906
Epididymitis, light and heat treatment of (ab)---------- 524
Epinephrin administered by rectum, reaction to (ab)------- 109
Episcleritis (ab)---------- 1070
Epithelioma of the lip, surgical treatment of (ab)---------- 523
Epitheliomata of thymic origin (ab) ---------- 521
Eradication of vermin--------- 1123
Errata ---------- 747
Eruptions caused by cowpox vaccination and those due to smallpox and chicken pox, diagnostic sign differentiating between---------- 290
Ethyl alcohol, caffeine, and nicotine on the behavior of rats in in a maze (ab)---------- 1063
Examination of patients by the anesthetist previous to anesthesia, importance of (ab)--- 320
Expedition of London School of Tropical Medicine to British Guiana (ab)---------- 115
Experimental rickets in rats (ab) ---------- 329
Ex-service man, social service worker and the---------- 653
Extraction and concentration of vitamines (ab)---------- 330
Eye disease due to syphilis and trypanosomiasis among Negroes of Africa (ab)-------- 111

Page.

Eye, ear, nose, and throat------ 111, 329, 540, 1065
Factors in bone repair (ab)---- 897
Far Eastern Association of Tropical Medicine ---------- 744
Fats and lipoids in blood after hemorrhage (ab)---------- 104
Fats, food value of various (ab) ---------- 106
Fat—soluble vitamine (ab)---- 539
Favus ---------- 154
Feces, occult blood in (ab)----- 105
Feeding habits of Stegomyia calopus (ab)---------- 99
Fifth Avenue Hospital--------- 351
First-aid work on shore with Royal Naval Division (ab)-- 89, 310
Fistulas, rectal, experimental and histological investigation (ab) ---------- 321
Flies by flight, dispersion of--- 739
Fluke disease, treatment of (ab) ---------- 97
Focal infection, iritis caused by (ab) ---------- 1070
Food and dietetics, what nurses need to know about--------- 919
Food value of various fats (ab)- 106
Foreign body in the right lower bronchus---------- 506
Form "X" Card---------- 283
Formaldehyde and fumigation (ab)---------- 1065
Four surgical cases, report of-- 58
Fractures of the head and neck of the radius (ab)---------- 323
Fractures of the humerus, treatment of by suspension and traction (ab) ---------- 3221
French Mediterranean Fleet during the war, health of---- 556
Frozen sections, technique of making and staining-------- 481
Fumigation and formaldehyde (ab) ---------- 1065
Gall bladder and bile ducts, operation on (ab)---------- 899
Gangosa (ab)---------- 1069
Gangosa and its relation to papulocircinate yaws (ab)-- 328
Gas analysis, sampling bottle for (ab)---------- 539

	Page.
Gastric ulcer, treatment of (ab)	509
Gas warfare, medical aspects of	641
Gauze, on the conservation of	880
General medicine	71, 301, 509, 889, 1041
Genito-urinary organs, absorption of local anesthetics through the (ab)	105
German measles	154
Gingivitis, acute ulcerative, a practical treatment of	883
Glanders	155
Glucemia and glucosuria (ab)	107
Glucosuria and glucemia (ab)	107
Glycosuria of malarial origin (ab)	904
Goiter, operative procedure on different kinds (ab)	900
Goiters, one thousand one hundred in one thousand seven hundred eighty-three persons (ab)	889
Gonorrhea, standard cure of (ab)	514
Habit of reading, on the	1032
"Hallux Valgus" (bunion) operations, using Mayo's technique, report of three	291
Head and neck of the radius, fractures of (ab)	323
Health conditions in the Navy	183, 372, 589
Health of Royal Air Force for the year 1920, report of	1085
Health of the French Mediterranean Fleet during the war	556
Heat and light treatment of epididymitis (ab)	524
Hemolytic substances in human urine (ab)	107
Hemorrhage, fats and lipoids in blood after (ab)	104
Hemorrhage following operation on the tonsil, statistical record of serious and fatal (ab)	541
Hemorrhage, in tonsil operations, conditions predisposing to (ab)	540
Hematoxins from parasitic worms (ab)	1053
Hereditary blood qualities (ab)	895
Hernia, recurrent	849
High blood pressure, causes and treatment of (ab)	72
High blood pressure, prognostic significance in persistent (ab)	1041
Histamine and pituitary extract in diabetes insipidus (ab)	102
Historical	35, 265, 461, 465, 699, 867, 1015
History of anesthesia in America	461
History of blood transfusion	465
Hongkong, tuberculosis in (ab)	99
Honors and distinctions	51
Hookworms, carbon tetrachlorid for removal of (ab)	1053
Hookworm infection in Brazil, studies of (ab)	326
Hookworm larvæ in the soil, activities of infective (ab)	1053
Hookworm survey	1082
Hookworm treatment, anthelmintics and (ab)	1064
Hospital, Fifth Avenue	351
Hospital morale	8
Hospital needs in New York	563
Hospital ship ventilation, a paper on	917
Hospital standardization program of the American College of Surgeons	293
Hospital yachts and small craft, surgery of naval wounded in (ab)	91
Human infection with *Isospora hominis* (ab)	328
Humerus, treatment of fractures of, by suspension and traction (ab)	322
Human trypanosomiasis with tryparsamide, treatment of (ab)	721
Hydatid disease, recurrence in a case of	288
Hydrochloric acid ingestion upon composition of urine in man, effect of (ab)	539
Hydrogen-ion concentration	973
Hygienic water analysis, indican in water as an aid to (ab)	108
Hyperthyroidism	454

	Page.
Hyperthroidism, diet in (ab)	102
Hypertrophic tuberculosis of the ileocecal region (ab)	319
Ileocecal region, hypertrophic tuberculosis of the (ab)	319
Immunity, discussion of, following cowpox vaccination, and revaccination against smallpox	411
Immunization of adults with diphtheria toxin-antitoxin mixture	907
Incineration of latrine contents	743
Inderwick, James, surgeon, United States Navy, 1813–1815	699
Indican in water as an aid to hygienic water analysis (ab)	108
Infected wounds, use of mercurochrome-220 in	718
Influenza on the U. S. S. Columbia	593
Influenza on the U. S. S. Wyoming	592
In memoriam	49
Instruction at Oteen	121
Instruction for nurses, course of	1097
Instructions to medical officers	191, 379, 600, 795, 961, 1143
International Association of the History of Medicine	742
International standardization of sera, a report of the	885
Intestinal amebæ of man, differential diagnosis of the common (ab)	728
Intraspinal treatment of neurosyphilis (ab)	516
Intravenous injection of antimony tartrate in bilharzia disease (ab)	526
Iodine for disinfecting the skin, use of (ab)	105
Ion migration between cells and plasma (ab)	329
Iritis caused by focal infection (ab)	1070
Iso-agglutination group percentages of in Filipino bloods (ab)	733
Isospora hominis, human infection with (ab)	328
Itch, Dhobie, produced by inoculating a culture of Epidermophyton rubrum (ab)	906
Japanese Medical World	343
Jaundice, biliary obstruction required to produce (ab)	1063
Kala-azar, treatment of, with some antimonial preparation (ab)	328
Laboratory observations on malaria (ab)	98
La maladie des oedemes à Java (ab)	901
Lamblia intestinalis, detection of by means of duodenal tube (ab)	726
Latrine contents, incineration of	743
Leadership, some elements of	251, 433
Leper segregation in the Philippines, experiment of (ab)	726
Leprosy (ab)	98
Leprosy, curative effects of chaulmoogra oil derivatives on	910
Leprosy, tubercular case of, treated by intravenous injections of stibenyl (ab)	725
Lesions in bones of rats suffering from uncomplicated beriberi (ab)	1065
Letter from Surgeon General to director of department of nursing, American Red Cross	122
Light and heat treatment of epididymitis (ab)	524
Lipoids and fats in blood after hemorrhage (ab)	104
Lipoids in treatment of drug addiction disease (ab)	104
Local and general spirochætosis (ab)	518
London School of Tropical Medicine, expedition of to British Guiana	115
Lung abscess following tonsillectomy (ab)	111
Malaria	158
Malaria afebrile quartan, with urticaria (ab)	324
Malaria cases, complexion of (ab)	526

	Page.
Malaria epidemic caused by M. sinensis (ab)	1060
Malaria epidemic in Naras in 1918 (ab)	1054
Malaria in Bulgaria	911
Malaria incidence on the Canal Zone (ab)	726
Malaria in eastern Cuba (ab)	905
Malaria, laboratory observations on (ab)	98
Malarial fevers, Wassermann reaction in (ab)	722
Malaria, mononuclear leucocyte count in (ab)	100
Malaria, specific treatment of (ab)	1054
Malaria, standard treatment of (ab)	529
Malaria, Wassermann reaction in (ab)	722
Mammalian embryos caused by radium emanation, disturbances in the development of (ab)	735
Manufacture of soft soap	746
Mastoid operations, one hundred	69
Measles	159
Measles, German	154
Medical aspects of gas warfare	641
Medical science, progress in	71, 301, 509, 721, 889, 1041
Medical zoology, recent progress in (ab)	524
Medicine and surgery from the German viewpoint, some lessons of the World War in	672
Medicine in art	1080
Medicine in Strasbourg, study of	874
Meningococcus infection (ab)	511
Meningococcus septicemia	855
Mercurochrome, diphtheria carriers and their treatment with (ab)	891
Mercurochrome–220 in infected wounds, use of	718
Mercurochrome–220 within the peritoneum, use of	717
Messing arrangements and food of ships	369
Metabolism, chloride (ab)	106
Metabolism in pellagra (ab)	889
Metabolism of the man of the Tropics (ab)	735
Methanol on trial (ab)	1062
Method for the determination of sugar in normal urine (ab)	333
Midshipmen, physical development of	239
Monilias of the gastrointestinal tract in relationship to sprue (ab)	326
Mononuclear leucocyte count in malaria (ab)	100
Montaigne and medicine	113
Morale, hospital	8
Morphine in experimental septicemia, influence of (ab)	1064
Mosquito eradication	1
Motor points, notes on	719
Mumps	162
Muscular exercise upon certain common blood constituents, effect of (ab)	333
Myocarditis, chronic, and its management (ab)	301
Myositis, tropical (ab)	727
National Board of Medical Examiners	116
Natural immunity of white rats to plague (ab)	903
Naval air station, naval operating base, Hampton Roads, Va., abstracts from annual sanitary report	597
Naval hospital, St. Thomas, Virgin Islands, notes from	187
Naval hospital, Washington, D. C., abstracts from annual sanitary report	597
Naval radio stations, San Juan and Cayey, P. R., abstracts from annual sanitary report	598
Naval training station, Great Lakes, Ill., notes from	379
Naval training station, Hampton Roads, Va., notes on	599
Naval wounded in hospital yachts and small craft, surgery of (ab)	91
Nephritis, chronic (ab)	83
Neurosyphilis	483
Neurosyphilis, intraspinal treatment of (ab)	516
Neurosyphilis, treatment of (ab)	1048

Page.

Nicotine, ethyl alcohol, and caffeine on the behavior of rats in a maze 1063
Nitrous oxide and cholemia (ab) 104
Nonsurgical drainage of the biliary tract (ab) 94
Nonsyphilitic diseases, use of arsphenamin in (ab) 520
Normal heart, size of the, a teleroentgen study 219
North Russia Expeditionary Force, care of sick and wounded of the 744
Nose, throat, and ear requirements of airmen (ab) 1065
Notes and comments 113, 339, 543, 739, 907, 1071
Notes on preventive medicine, preventive medicine statistics, letters, orders, new legislation, movements of officers and nurses 141, 363, 574, 769, 937, 1115
Nurse Corps 121, 351, 561, 749, 919, 1095
Nursing—1814—prophecy 749
Nursing—1922—development 750
Occult blood in the feces (ab) 105
Odd notes 564, 1095
Old Anatomical School at Padua 1015
On making of abstracts 280
On the endocrine glands 821
On the expression of visual acuity in medical reports 282
Operating room 100 years ago 118
Operations of gall bladder and bile ducts (ab) 899
Oral administration of pituitary extract (ab) 72
Orders issued to medical officers and dental officers and nurses 213, 403, 632
Oriental sores (ab) 324
Oteen, instruction at 121
Pacific Fleet, venereal prophylaxis in 113
Paints, use of white lead in 914
Papers by naval medical officers 118, 918
Papulocircinate yaws, etiology of gangosa and its relation to (ab) 328

Page.

Parasitic worms, hemotoxins from (ab) 1053
Paratyphoid fever 163
Parathyroids and creatinine (ab) 334
Pathologist as an essential factor in clinical diagnosis 14
Pellagra, metabolism in (ab) 889
Pellagra, thiocyanate content of the saliva and urine in (ab) 337
Pellagra, urine in (ab) 103
Peri-arterial sympathetics (ab) 896
Peritoneum, use of mercurochrome—220 within the 717
Pernicious anemia (ab) 78
Pernicious anemia, balantidium coli and (ab) 727
Pharmacology of some benzyl esters (ab) 108
Phosphorus and fat, soluble, A, production of rickets by diet low in (ab) 332
Physical examination of aviators 983
Physical development of midshipmen 239
Picric acid, toxic effects of 1071
Pituitary extract and histamine in diabetes insipidus (ab) 102
Pituitary extract, oral administration of (ab) 72
Plague 164
Plague in South Africa, outbreak of 1075
Plague, relation of species of rat fleas to the spread of 1077
Pneumonia 166
Pneumonia in children 564
Pneumonia, vaccine in the prevention of 540
Pneumonia, prophylactic vaccination for the prevention of 348
Poisoning due to the venom of a snake, treatment of 557
Poliomyelitis 165
Poliomyelitis, transmission of, nature and mode of 771
Postgraduate study for nurses 351
Postoperative pulmonary complications (ab) 1051
Potato, antiscorbutic action of raw 101
Predisposing factor in diphtheria (ab) 81

Page.
Preservation of lemon juice and prevention of scurvy, experiments on (ab) 303
Preventive inoculation in smallpox, method of 916
Preventive medicine statistics, letters, orders, new legislation, movements of officers and nurses 141, 363, 574, 769, 937, 1115
Production of rickets by diets low in phosphorus and fat soluble A (ab) 332
Progress in medical science 71, 302, 509, 721, 889, 1041
Prophylactic vaccination for the prevention of pneumonia 348
Prophylaxis of syphilis with arsphenamin (ab) 520
Protein in cerebrospinal fluid, (ab) 102
Proteins, supplementary values, of (ab) 531
Provocative procedures in diagnosis of syphilis (ab) 515
Public health in the Dominican Republic (ab) 733
Pulmonary complications, postoperative (ab) 1051
Pulmonary syphilis (ab) 517
Puncture, venous, by means of steel needles (ab) 307
Pyelonephritis, a critical review of one hundred cases 844
Queries 139, 361, 572, 767, 935, 1111
Rabies 167
Rat fleas to the spread of plague, relation of species of (ab) 1077
Rat repression by sexual selection (ab) 723
Rats, experimental rickets in (ab) 329
Rats in a maze, nicotine, ethyl alcohol, and caffeine on the behavior of (ab) 1063
Rats to plague, natural immunity of white (ab) 903
Rats, upkeep of 746
Reading, on the habit of 1032
Receiving ship, Norfolk, Va., notes on 599
Page.
Rectal fistulas, experimental and histological investigation of (ab) 321
Recurrence in a case of hydratid disease 288
Recurrent hernia 849
Refraction of seventy-six midshipmen, results of 285
Reinfection and curability in syphilis (ab) 517
Relapsing fever in Panama (ab) 327
Removal of stains from wash goods 551
Renal excretion (ab) 110
Reorganization of the sanitary and public health work in the Dominican Republic under United States Military Government of Santo Domingo 657
Reports 293, 885, 1085
Respiration and blood alkali, during carbon monoxide asphyxia (ab) 330
Result of refraction of seventy-six midshipmen 285
Revaccination against smallpox and a discussion of immunity following cowpox vaccination 411
Rickets in rats, experimental (ab) 329
Rocky Mountain spotted or tick fever 168
Royal Naval Division, first-aid work on shore with (ab) 89, 310
Royal Society of Tropical Medicine and Hygiene, meeting of 909
Sampling bottle for gas analysis (ab) 539
Sanitary and public health work in the Dominican Republic under the United States Military Government of Santo Domingo, review reorganization of the 657
Sanitary condition of living compartments, etc., of ships 368
Sanitary survey, intelligence data in connection with a 184
Sanitary survey of ships 363

Page.

Sanitary survey of shore stations and its practical application ---- 937
Scarlet fever ---- 169
Scarlet red emulsion in atrophic rhinitis, use of (ab) ---- 337
Schistosomes in Natal, which possibly attack man, Three (ab) ---- 324
School of Tropical Medicine at Calcutta ---- 344
Scurvy, a system of prevention for a polar expedition based on present day knowledge (ab) ---- 304
Scurvy, experiments on the preservation of lemon juice and prevention of (ab) ---- 303
Septicemia and death following streptococcus tonsillitis (ab) 1069
Septicemia, experimental, influence of morphine in (ab) ---- 1064
Septicemia, meningococcus ---- 855
Septic sore throat ---- 170
Sera, international standardization of, a report of the ---- 885
Sewage and refuse disposal of ships ---- 372
Shark bite, report of a case of ---- 881
Silver arsphenamin, therapeutic index of ---- 1081
Size of the normal heart, a teleroentgen study ---- 219
Sleeping sickness, treatment of (ab) ---- 730
Smallpox ---- 171
Smallpox in the United States 187, 591
Smallpox, revaccination against, and a discussion of immunity following cowpox vaccination ---- 411
Soap, manufacture of soft ---- 746
Social hygiene section of Bureau of Navigation transferred to the Bureau of Medicine and Surgery ---- 590
Social service worker and the ex-service man ---- 653
Some elements of leadership ---- 251,433
Some lessons of the World War in medicine and surgery from the German viewpoint ---- 672

Page.

Sores, oriental (ab) ---- 324
Spiders in medicine ---- 339
Spirochæta pallida, dissemination of, from the primary focus of infection (ab) ---- 516
Spirochæta pallida in the tissue, method for demonstration of (ab) ---- 1050
Spirochætosis, local and general (ab) ---- 518
Spirochetes, strain in (ab) ---- 893
Sprue, Monilias of the gastrointestinal tract in relation to (ab) ---- 326
Stains from wash goods, removal ---- 551
Statistical record of serious and fatal hemorrhage following operation on the tonsil (ab) ---- 541
Statistics, vital ---- 199, 388, 616, 799, 968, 1152
Stegomyia calopus, feeding habits of (ab) ---- 99
Sterilization of water mains on the U. S. S. Mississippi ---- 942
Sterilization, ten-second ---- 717
St. Medard, Peter, surgeon in the Navy of the United States 867
Strain in spirochetes (ab) ---- 893
Streptococcus tonsillitis, septicemia and death following (ab) ---- 1069
Study of medicine in Strasbourg ---- 374
Submarine notes ---- 343
Suggested devices ---- 283, 481, 1037
Surgery ---- 89, 310, 521, 896, 1051
Surgery of naval wounded in hospital yachts and small craft (ab) ---- 91
Surgical procedure, tonsillectomy ---- 17
Surgical treatment of epithelioma of the lip (ab) ---- 523
Surgical ulcers of stomach and duodenum, treatment of ---- 497
Sweden, alcohol question in ---- 649
Syphilis ---- 172
Syphilis, abdominal (ab) ---- 516
Syphilis and trypanosomiasis among Negroes of Africa, eye disease due to (ab) ---- 111

Page.

Syphilis, Army method of handling 345
Syphilis, diagnosis and treatment of early (ab) 517
Syphilis, modern conceptions in the treatment of (ab) 1045
Syphilis of the heart (ab) 513
Syphilis, provocative procedures in diagnosis of (ab) 515
Syphilis, pulmonary (ab) 517
Syphilis, reinfection and curability in (ab) 517
Syphilis, treatment of visceral (ab) 1049
Tartar emetic, bilharzia diseases treated with (ab) 733
Tattooing dangerous 186
Technique for staining treponema pallida (ab) 1050
Teleroentgen study of the size of the normal heart 219
Technique of making and staining frozen sections 481
Ten-second sterilization 717
Tetanus 173
Therapeutic index of silver arsphenamin 1081
Thiocyanate content of the saliva and urine in pellagra (ab) 337
Three Horsemen and the Body Louse 713
Three old books 550
Throat, nose, and ear requirements of airmen (ab) 1065
Thymic origin, epitheliomata of (ab) 521
Tick or Rocky Mountain spotted fever 168
Tongue, cancer of (ab) 901
Tonsillectomy, a surgical procedure 17
Tonsillectomy, lung abscess following (ab) 111
Tonsil operations, conditions predisposing to hemorrhage in (ab) 540
Toxic effects of chlorine antiseptics in dogs (ab) 109
Trachoma 174
Transfused blood (ab) 1063
Transfused blood, study of (ab) 71, 1063

Page.

Transmission of poliomyelitis, nature and mode of 771
Treponema pallida, new technique for staining (ab) 1050
Trichinosis 175
Trichomonas hominus, cultivation of (ab) 325
Trichuriasis with Leche de Higueron treatment of (ab) 905
Tropical medicine 97, 324, 524, 721, 901, 1053
Tropical Medicine, School of, at Calcutta 344
Tropical myositis (ab) 727
Tropical ulceration, an exceptional (ab) 1062
Tubercle bacilli, virulence of, under changing environment 910
Tubercular leprosy treated by intravenous injections of stibenyl, case of (ab) 725
Tuberculosis, Chaulmoogra oil in 118
Tuberculosis in Hongkong (ab) 99
Tuberculosis (other than pulmonary) 177
Tuberculosis (pulmonary) 176
Two deaths caused by accumulation of carbon dioxide in a flour hold 769
Typhoid fever 178
Typhus fever 179
Ueber einen Fall von Filaria loa (ab) 906
Ulceration, an exceptional tropical (ab) 1062
Ulcerative Gingivitis, acute, a practical treatment of 883
Ulcer, gastric, treatment of (ab) 509
Ulcers, surgical, of stomach and duodenum, treatment of 497
Ulcers, varicose (ab) 901
Une nouvelle maladie â bacilles acido—résistants qui n'est ni la tuberculose, ni la lèpe (ab) 1059
Urinary constituents, effect of water d'uresis on the elimination of certain (ab) 110
Urine hemolysis coefficient (ab) 106
Urine, hemolytic substances in human (ab) 107

	Page.
Urine in pellagra (ab)	103
Urine, method for the determination of sugar in normal (ab)	333
Use of mercurochrome–220 in infected wounds	718
Use of mercurochrome — 220 within the peritoneum	717
Use of scarlet red emulsion in atrophic rhinitis (ozena) (ab)	337
U. S. Pharmacopœia, tenth revision of	543
U. S. S. Cleveland, abstracts from annual sanitary report	594
U. S. S. Columbia, influenza on	593
U. S. S. Culgoa, abstracts from annual sanitary report	595
U. S. S. Fish Hawk, abstracts from annual sanitary report	378
U. S. S. Mayflower, abstract from annual sanitary report	376
U. S. S. Mississippi, sterilization of water mains on the	942
U. S. S. New Mexico, diphtheria on, report of an outbreak of	775
U. S. S. Nokomis, abstracts from annual sanitary report	378
U. S. S. Pyro, abstracts from annual sanitary report	595
U. S. S. Sacramento, abstracts from annual sanitary report	595
U. S. S. South Carolina, abstracts from annual sanitary report	374
U. S. S. Tacoma, abstracts from annual sanitary report	375
U. S. S. Wilkes, abstracts from annual sanitary report	596
U. S. S. Williamson, abstracts from annual sanitary report	596
U. S. S. Wyoming, influenza on	592
Vaccine in the prevention of pneumonia	546
Value of drugs	352
Varicella and variola, differential diagnosis between (ab)	80
Varicose ulcers (ab)	901
Variola and varicella, differential diagnosis between (ab)	80
Venereal prophylaxis in Pacific Fleet	113
Venous puncture by means of steel needles (ab)	307
Ventilation, a paper on hospital ship	917
Ventilation of ships	371
Vermin, eradication of	1123
Vesical bilharziasis (ab)	1062
Virulence of tubercle bacilli under changing environment	910
Visceral syphilis, treatment of (ab)	1049
Vitamine content, studies in (ab)	539
Vitamine, fat-soluble (ab)	539
Vitamines, antiscorbutic, contained in dehydrated fruits	1082
Vitamines, extraction and concentration of (ab)	330
Wassermann reaction (ab)	308
Wassermann reaction in malaria (ab)	722
Wassermann reactions in malarial fever (ab)	722
Wassermann reaction, Standardization of the (ab)	1044
Water diuresis on the elimination of certain urinary constituents, effect of (ab)	110
Water supply of ships	372
White lead in paints, use of	914
Whooping cough	179
With Anson to Juan Fernandez	35, 265
"X" card, Form	283
Yellow fever	180
Zoology, medical, recent progress in (ab)	524

[Articles not appearing in full in the BULLETIN are marked (ab.).]

	Page.
Adler, E. (ab)	105
Adler, S. (ab)	98
Albert, J. (ab)	726
Alberty, W. M	483
Alcock, A. (ab)	524
Alder, J. C. (ab)	102
Allen, A. H	1
Allen, F. M. (ab)	100, 101
Amati, A. (ab)	106
Anderson, J. (ab)	903
Appel, F. (ab)	727
Apperly, R. E. (ab)	320
Archibald, R. G. (ab)	725
Aron, H. (ab)	106
Arrowsmith, H. (ab)	1069
Ashby, W. (ab)	71, 1063
Augustine, D. L. (ab)	1053
Bagg, H. J. (ab)	735
Bahmachari, U. M. (ab)	328
Bailey, C. V. (ab)	539
Bainbridge, W. S	672, 719
Bainbridge, W. S. (ab)	897
Baker, C. R	881
Barbour, H. G. (ab)	109
Barges, I. (ab)	1062
Barker, L. F. (ab)	72
Bartlett, W. (ab)	900
Bass, C. C. (ab)	529, 1054
Bassett-Smith, P. W. (ab)	303
Bates, L. B. (ab)	327
Baumann, M. (ab)	906
Benedict, S. R. (ab)	333, 735
Benedict, W. L. (ab)	1070
Bessonoff, N. (ab)	101
Bettencourt, A. (ab)	1062
Biffis, P. (ab)	78
Blake, J. A. (ab)	322
Bloedorn, W. A	219, 855
Bloodgood, J. C. (ab)	901
Bloom, W. (ab)	1063
Boenheim, F. (ab)	106
Bolin, Z. E. (ab)	904
Boone, J. T	653
Boutwell, P. W. (ab)	539
Boyd, M. F. (ab)	326
Boyd, W. (ab)	726
Brams, W. A	25
Brandon, W. L. (ab)	901
Brooks, H. (ab)	513
Broughton, Alcock, W. (ab)	98
Brown, W. H. (ab)	516
Bunker, C. W. O	937
Burke, V. (ab)	102
Butts, H	483
Caius, J. F. (ab)	1064
Carr, A. D. (ab)	110
Castellani, A. (ab)	904
Cawston, F. G. (ab)	97, 324, 733
Chambers, J. Q. (ab)	516
Christian, H. A. (ab)	301
Christopherson, J. B. (ab)	526
Cort, W. W. (ab)	1053
Craig, C. F. (ab)	728
Connor, R. C. (ab)	725
Cram, E. B. (ab)	97
Crichlow, W. (ab)	325
Darling, S. T. (ab)	326
Dauson, P. P. (ab)	889
Dawson, P. R. (ab)	103, 337
de Scabia, A. (ab)	1062
de Silva, R. (ab)	906
Desmarest, E. (ab)	104
Doisy, E. A. (ab)	329
Dunn, L. H. (ab)	327
Dutcher, R. A. (ab)	331
Eaton, E. P. (ab)	329
Eddy, W. H. (ab)	539
Eijkman, C. (ab)	735
Farenholt, A	283
Farrar, L. K. P. (ab)	103
Feigh, J. (ab)	104
Fisher, A. R. (ab)	91
Foote, O. C	844
Franceschi, G. (ab)	1062
Fraser, A. R. (ab)	514
Fróes, J. A. G. (ab)	324
Gabriel, W. B. (ab)	321
Gettler, A. O. (ab)	891
Gibbes, J. H. (ab)	517
Gibson, R. B. (ab)	102

Page.

Gin-Ching Ting (ab) 1062, 1063
Goodman, H. (ab) 520
Gordon, R. M. (ab) 99
Goto, M. (ab) 1063
Graham, G. (ab) 107
Gralka, R. (ab) 106
Gray, G. A. (ab) 891
Green, J. W 69, 506
Gudernatsch, J. F. (ab) 735
Haggard, H. W. (ab) 105, 330
Hall, J. S. (ab) 331
Hall, M. C. (ab) 1053
Hamill, P. (ab) 72
Hammett, F. S. (ab) 334
Hannibal, E. A. (ab) 326
Hanson, H. (ab) 726
Harper, J 14, 481, 1037
Harshaw, H. M. (ab) 331
Hart, E. B. (ab) 333
Harvey, H. E 717
Haughwont, F. G. (ab) 328
Hayden, R 657
Heft, H. L. (ab) 539
Hehir, E. L 121
Heinkamp, W. J. R. (ab) 104
Henderson, Y. (ab) 330
Herrick, W. W. (ab) 511
Herrmann, J. B. (ab) 109
Hess, A. F. (ab) 329
Higgins, J. A. (ab) 108
Hirsch, E. W. (ab) 524
Hitzrot, J. N. (ab) 323
Hjort, A. M. (ab) 109
Hogue, M. J. (ab) 325
Holcomb, R. C. 293
Hoppert, C. A. (ab) 333
Horn, D. W. (ab) 1065
Horovitz, A. S. (ab) 104
Hoskins, R. G. (ab) 109
Hughes, F. A 285
Hussey, L. D. A. (ab) 304
Hylkema, B. (ab) 1054
Jackson, T. W. (ab) 733
Jacobi, L. (ab) 517
Jacobs, I. W 57
Jennison, G. (ab) 723
Johnson, L. W 717, 849
Johnson, R. (ab) 539
Jolles, A. (ab) 108
Jona, G. (ab) 526
Kelly, A. B. (ab) 541
Kerr, W. M. 35, 43, 49, 265, 280, 465, 477, 480, 867, 877, 1115

Page.

Killian, J. A. (ab) 110
King, J. T., jr. (ab) 530
Kojima, M 821
Kolmer, J. A. (ab) 1044
Kraft, A. (ab) 1064
Kritchevsky, B. (ab) 518
Lascombes (ab) 104
Leitch, N. M. (ab) 1064
Leriche, R. (ab) 895
Levin, M. B. (ab) 1070
Levin, S. (ab) 890
Levy, M. D. (ab) 722
Levy, P. P. (ab) 307
Logan, A. H. (ab) 727
Lucey, H. C. (ab) 100
Macht, D. I. (ab) 105, 1067, 1063
Macklin, A. H. (ab) 304
Mankin, G. H 641
Martin, F. T. (ab) 102
Martin, W. L 718
Marchoux, E. (ab) 1059
Manson-Bahr, P. H. (ab) 902, 1055
McCann, G. F. (ab) 329
McCarthy, A. C. (ab) 539
McClendon, J. F. (ab) 330
McCollum, E. V. (ab) 332, 531, 1065
McCrae, T. (ab) 1049
McMaster, P. D. (ab) 1063
McMullin, J. J. A 58, 497
Mendelson, R. W. (ab) 1062
Meyer, B. L. (ab) 891
Mhaskar, K. S. (ab) 1064
Michel, L. L. (ab) 520
Mitchell, J. H. (ab) 516
Munson, E. L 8, 251, 433
Myers, V. C. (ab) 110
Myerson, M. C. (ab) 1069
Nash, T. P., jr. (ab) 735
Nedergaard, M. (ab) 905
Neuberger, J. F 834, 983
Nichols, H. J. (ab) 520
Nielsen, C. (ab) 108
Noguchi, H. (ab) 102, 1050
Norburn, C. S 63, 288
O'Leary, P. A. (ab) 515
O'Malley, J. F. (ab) 540
Osterberg, E. (ab) 333
Ottenberg, R. (ab) 895
Pappenheimer, M. M. (ab) 329
Park, E. A. (ab) 332
Parsons, H. T. (ab) 531
Payne, G. C. (ab) 1053
Pearce, L. (ab) 516, 721

	Page.
Pearl, R. (ab)	530
Pepper, O. H. P. (ab)	1051
Peter, T. B. (ab)	893
Peterson, E	411
Piersol, G. M. (ab)	1041
Pischel, D. (ab)	102
Pleadwell, F. L	699
Ponder, E. (ab)	107
Rakestraw, N. W. (ab)	333
Ranken, D. (ab)	1065
Ranson, B. H. (ab)	97
Ray, M. R. (ab)	308
Reasoner, M. A. (ab)	520
Reed, T. W	454
Ringer, A. I. (ab)	83
Robertson, A. (ab)	904
Robertson, W. S. (ab)	517
Robnett, A. H	291
Romanelli, E. (ab)	80
Rose, C. W	881
Rosenbloom, J. (ab)	102
Ross, J. N. MacB. (ab)	89, 310
Rous, P. (ab)	1063
Roy, J. N. (ab)	111
Sacks, B. (ab)	1070
Salm, A. C. (ab)	901
Seal, J. C. (ab)	337
Schaffer, C	1037
Schamberg, J. F. (ab)	1045
Schick, B. (ab)	81
Schmitter, F. (ab)	328
Schüffner, W. (ab)	1054
Schwartz, B. (ab)	1053
Scott, H. H. (ab)	99
Seedorf, J. (ab)	105
Seguin, P. (ab)	518
Sell, M. T. (ab)	539
Shaffer, L. W	1011
Shaffer, P. A. (ab)	321
Shere, O. M. (ab)	319
Shipley, P. G. (ab)	332, 1065
Simmonds, N. (ab)	332, 531, 1065
Simmons, J. (ab)	904
Sinskey, H. L. (ab)	1070
Sistrunk, W. E. (ab)	523
Smillie, N. G. (ab)	326
Smith, H. W	219
Smith, H. W. (ab)	1064
Smithies, F. (ab)	941, 509
Solomon, H. C. (ab)	1048
Spencer, R. R. (ab)	903
Spruit, C. B. (ab)	905
Stalnaker, P. R	290
Stanton, R. E. (ab)	103, 889
Starry, A. C. (ab)	1050
Steenbock, H. (ab)	333, 539
Stehle, R. L. (ab)	539
Stevenson, H. C. (ab)	539
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Symmers, D. (ab)	521
Takahata, T. (ab)	1063
Takeuchi, K. (ab)	104
Taussig, A. S. (ab)	319
Taylor, E. B	239
Taylor, J. S	461, 649, 874
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Treston, M. L. (ab)	324
Trible, G. B	17
Truesdale, P. E. (ab)	899
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47

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